

Discovering Economics

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Greg Parry

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7th edition

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First edition	2009
Second edition	2011
Third edition	2014
Fourth edition	2016
Fifth edition	2018
Sixth edition	2020
Seventh edition	2022

TACTIC PUBLICATIONS PTY LTD
P.O. BOX 870
SOUTH PERTH WA 6151
www.tacticpub.com.au
ABN 12 056 615 153

National Library of Australia
cataloguing in publication data

Parry, Greg
Kemp, Steven

Discovering Economics 7th edition

for secondary school students
includes index

ISBN Print edition: 978-1-875313-59-4
ISBN Digital edition: 978-1-875313-61-7
Economics 330

Cover art - acrylic by Julie Kemp
Proudly printed in Western Australia by Scott Print

Discovering Economics

7th edition

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Preface

This text is written for the Economics ATAR (Australian Tertiary Admission Rank) course for year 11 students in Western Australia. It provides an introduction to the exciting and relevant world of economics. The text covers key concepts in both microeconomics and macroeconomics. Microeconomics is concerned with individual decision-making for both consumers and producers. Microeconomics studies how resources are allocated in the economy. Macroeconomics is a study of the business cycle and economic growth.

Economic issues now dominate the world agenda. Economic literacy is therefore essential for all students no matter what further study or career they undertake. We believe that it is important for economics to be promoted as a method of thinking logically about a wide range of problems. It is hoped that students will recognise the need to be well informed about current economic issues, and be able to relate this to the economic theory presented in the text.

Our wives and children have discovered the meaning of one of the most important concepts in economics during the time we have devoted to preparing this book (opportunity cost) and deserve thanks for their patience and understanding.

Greg Parry and Steven Kemp

January 2022

Discovering Economics

Contents

Part A	Introduction to Microeconomics	Page
1	What is economics?	1
2	Demand and supply	20
3	Elasticity	41
4	Market efficiency	59
5	Market failure	79
Part B	Introduction to Macroeconomics	Page
6	Macroeconomic activity	97
7	Economic growth	117
8	The business cycle	135
9	Inflation	147
10	Unemployment	159
11	Trade and the balance of payments	171
12	The role of government	189
13	Macroeconomic performance	207
	Index	223

Chapter Contents

Chapter	Section	Page
1	1.1 <i>The meaning of economics</i>	2
	1.2 <i>The science of economics</i>	6
	1.3 <i>Scarcity, choice and opportunity cost</i>	9
	1.4 <i>The production possibility frontier</i>	13
	1.5 <i>The economic system</i>	17
2	2.1 <i>The role of markets</i>	21
	2.2 <i>The demand side of the market</i>	23
	2.3 <i>The supply side of the market</i>	28
	2.4 <i>Equilibrium price and quantity</i>	31
	2.5 <i>Changes in demand and supply</i>	33
	2.6 <i>Case studies</i>	39
3	3.1 <i>Price elasticity of demand</i>	42
	3.2 <i>Price elasticity of supply</i>	51
	3.3 <i>Income and cross elasticity of demand</i>	53
	3.4 <i>Applications of elasticity</i>	55
4	4.1 <i>Demand and consumer surplus</i>	60
	4.2 <i>Supply and producer surplus</i>	64
	4.3 <i>Total surplus</i>	66
	4.4 <i>Government policies that reduce economic efficiency</i>	69
	4.5 <i>The concept of equity</i>	77
5	5.1 <i>Market power</i>	80
	5.2 <i>Externalities</i>	85
	5.3 <i>Public goods and common resources</i>	90
	5.4 <i>Case studies in market failure</i>	94
6	6.1 <i>Introduction to macroeconomics</i>	98
	6.2 <i>The circular flow of income model</i>	99
	6.3 <i>Macroeconomic equilibrium</i>	103
	6.4 <i>Gross Domestic Product</i>	108
	6.5 <i>The determinants of aggregate expenditure</i>	111

Chapter	Section	Page
7	<i>7.1 Macroeconomic objectives</i>	118
	<i>7.2 Economic growth</i>	119
	<i>7.3 GDP as a measure of economic growth</i>	123
	<i>7.4 The determinants of economic growth</i>	126
	<i>7.5 The benefits and costs of economic growth</i>	131
8	<i>8.1 The business cycle</i>	136
	<i>8.2 Indicators of macroeconomic activity</i>	141
9	<i>9.1 The concept and measurement of inflation</i>	148
	<i>9.2 The types of inflation</i>	153
	<i>9.3 The effects of inflation</i>	155
10	<i>10.1 Unemployment and its measurement</i>	160
	<i>10.2 The types and causes of unemployment</i>	163
	<i>10.3 The effects of unemployment</i>	168
	<i>10.4 The relationship between unemployment and inflation</i>	169
11	<i>11.1 The pattern of Australia's trade</i>	172
	<i>11.2 Australia's trade balance</i>	176
	<i>11.3 The balance of payments</i>	178
	<i>11.4 The current account</i>	182
	<i>11.5 The capital and financial account</i>	185
	<i>11.6 The relationship between the current and financial accounts</i>	187
12	<i>12.1 The role of government</i>	190
	<i>12.2 Australia's taxation system</i>	196
	<i>12.3 The distribution of income</i>	201
13	<i>13.1 Economic objectives</i>	208
	<i>13.2 Recent macroeconomic performance</i>	210
	<i>13.3 The impact of recent events on the economy</i>	211

1 What is economics?



Learning Objectives

In this chapter you will learn about:

- *the meaning of economics*
- *scarcity and the economic problem*
- *the distinction between microeconomics and macroeconomics*
- *the different types of resources*
- *the concept of scarcity and tradeoffs*
- *the meaning of opportunity cost*
- *the use of economic models*
- *the distinction between positive and normative economics*
- *the production possibility frontier model*

1.1 The meaning of economics

Economics is the most important subject you will ever study! Economics is also the most useful subject you will ever study! Economics will provide you with important insights into how the world operates and will also help you in making decisions throughout your entire life. In fact every decision you make is an economic decision. Economics is important because it permeates every aspect of life. Economic issues are everywhere. Consider, for example:

- the Covid pandemic
- climate change
- petrol prices
- university entrance scores
- the value of the \$AUD

Why did the Covid pandemic cause a global recession? Why is there a shortage of hospital beds in a country as wealthy as Australia? Why is there a shortage of water in Australia? Why do you need an entrance score to gain a place at university? Will I get a job when I graduate? Why are some countries poor and others rich? Why do some people earn more income than others? Should there be a price on carbon emissions? It is impossible to escape economic issues and that is why everyone should have some basic economic literacy in order to understand and participate in today's economic world.

What is the subject matter of economics? Economics deals with two basic facts - first, people are faced with **limited resources** and second they have **unlimited wants**. This is referred to as the basic **economic problem**. The economic problem is on the one hand a problem of **scarcity** and on the other, a problem of **choice**. It is a problem of scarcity because there are simply not enough resources to satisfy an infinite number of wants. Individuals have basic wants of food, clothing, and housing. They also have other wants including transport, entertainment, and leisure. In economics we say that resources are scarce relative to wants. Scarcity is the most fundamental concept in economics! Almost everything is scarce - food, cars, water, iPhones, computers and vaccines! Anything that has a price is scarce. Free goods are not relatively scarce and do not have a price. The air that you breathe is currently free but perhaps in the future it may have a price.

Global warming and climate change is a good example of the economic problem. The atmosphere has over time become a scarce commodity. Carbon dioxide emissions are continuously pumped into the atmosphere by industry, agriculture and households. Almost all production and consumption involves the use of fossil fuels - driving cars, food production, factory output and using electricity for lights and household appliances. The world relies on carbon based energy resources - coal, oil and natural gas. The use of these resources imposes a major environmental cost in terms of increased greenhouse gases in the atmosphere which raises global temperatures and changes world climate.

It is important to understand that the word scarcity in economics does not have the same meaning as the dictionary definition. For example, cars are plentiful in Australia (they are not physically scarce) - in 2019, over one million new cars were sold in Australia. However, an economist would say that cars are relatively scarce because they are not free - everyone who wants a car may not necessarily be able to afford one. Cars are not given away for free to anybody who wants one! This applies to most goods and services. There are some government services which are provided free but the cost of these services are paid for out of tax revenue - public health and public education, roads and footpaths are examples. So even these goods are scarce.

It is important not to confuse the concept of scarcity with the word shortage. Almost everything is scarce - everything you buy that has a price is scarce. A shortage occurs when the supply of something is limited. Cars are a scarce economic good, but there is not a shortage of cars in Australia. Scarcity is also not the same thing as poverty. Poverty is a lack of income to meet basic economic needs.

Rich and poor nations alike suffer from the economic problem. The richest person in the world may be able to satisfy all their basic needs but they will still suffer from a limited amount of time.

The second aspect of the economic problem is the problem of choice. Given that scarcity exists for all people, consumers, producers and society must decide which wants they will satisfy. Should I spend my \$20 going to the movies, purchasing songs from itunes, or buy a lotto ticket? Should the government spend more money on health, education or the environment? Making choices when confronted by scarcity involves a trade-off.

Economics is the study of how people allocate their limited resources to satisfy their unlimited wants.

Economics is the study of the economic problem - it is a study of scarcity and a study of choice

The economic impact of the covid pandemic

By 2021, the pandemic had reached every country in the world. Globally there were over 250 million cases and over 5 million deaths (September 2021). In Australia there were around 100,000 cases and 1200 deaths. The pandemic resulted in a global recession with significant falls in national income accompanied by many job losses and business closures. The IMF estimated that the global economy shrunk by over 4% in 2020. The decline was the worst since the Great Depression of the 1930s. Governments imposed tight restrictions on domestic and international travel in order to minimise the spread of the virus. Masks and 'social distancing' became the new normal. Millions of workers were put on government-supported job retention schemes as parts of the economy, such as tourism and hospitality, came to a near standstill. In most countries, the health sector was placed under extreme pressure as case numbers soared. Governments had to allocate more resources into the health sector which reduced spending in other sectors. Central banks in most countries, including Australia, slashed interest rates in order to make borrowing cheaper and encourage spending to boost the economy. Hospital beds, oxygen supplies and Covid vaccines were suddenly relatively scarce. A timely reminder that the economic problem is as relevant as ever.

Figure 1.1 Definitions of economics

Adam Smith	<i>"Economics is an enquiry into the nature and causes of the wealth of nations".</i>
Wikipedia	<i>"Economics is the social science that studies the production, distribution, and consumption of goods and services."</i>
Alfred Marshall	<i>"Economics is a study of mankind in the ordinary business of life it is on the one side a study of wealth; and on the other, the more important side, a part of the study of man".</i>
John Maynard Keynes	<i>"Economics is a method rather than a doctrine; an apparatus of the mind, a technique of thinking which helps its possessor to draw correct conclusions".</i>
Paul Samuelson	<i>"Economics is the study of how people and society choose to employ scarce productive resources, which could have alternative uses, to produce various commodities, and the distribution of these commodities among people and groups".</i>
Milton Friedman	<i>"Economics is the science of how a particular society solves its economic problems".</i>
Jacob Viner	<i>"Economics is what economists do".</i>
Joan Robinson	<i>"The purpose of studying economics, is not to devise a set of ready-made answers to economic problems, but to learn how to avoid being deceived by economists"</i>
International Encyclopedia of Social Sciences	<i>"Economics is the study of the allocation of scarce resources among unlimited and competing uses".</i>

Every society must make choices about what goods and services should be produced, how these goods and services will be produced and who will receive the goods and services. These are referred to as the three basic questions that any economic system must answer:

- what to produce?
- how to produce?
- for whom to produce?

One way to describe the subject matter of economics is that it is concerned with the production, distribution and consumption of goods and services. In other words, economics is concerned with the allocation of society's scarce resources and the distribution of income. Figure 1.1 lists several definitions of economics. Most of these definitions focus on the problem of scarcity.

Adam Smith (1723-1790) is regarded as one of the founders of economics, in recognition of his 1776 work entitled *"An Inquiry into the Nature and Causes of The Wealth of Nations"*. Smith extolled the virtues of the free market economy as being an efficient way to deal with the economic problem and highlighted the importance of specialisation. A simple definition of economics is that it is the study of how people

and society deal with the basic problem of scarcity. In other words, *economics is the study of how people allocate their limited resources to satisfy their unlimited wants*. Economics is a **social science** because it uses the scientific method to investigate and analyse human behaviour. Economists develop and use economic models to formulate theories about how people make decisions. People have unlimited wants and the resources or factors of production to satisfy these wants are limited. Resources are therefore said to be scarce relative to wants - we simply do not have enough of them to satisfy the infinite number of wants. Read the definitions in figure 1.1 and identify the common elements.

Economic matters affect all people at all ages, and in all walks of life. As Alfred Marshall noted, economics is a study of the ordinary business of life - how to allocate time between work, leisure and study, and how to spend income. Another famous economist, John Maynard Keynes, regarded economics as more of a thinking process rather than as a body of knowledge. Economics provides a very useful framework for making decisions when confronted with scarcity.

Types of resources

Economists identify three general types of **resources**, or **factors of production**:

- natural resources
- human resources
- capital resources

Natural resources are the “gifts of nature” - resources such as air, water, minerals, energy resources such as coal and oil, and soil and vegetation. Basically any resource that is supplied from the natural environment. **Human resources** refers to the quantity and quality of the labour force. Human resources can be divided into **labour** (the physical or mental effort applied in the production of a good or service) and **enterprise** (the coordination and management of production by an entrepreneur). Enterprise also represents the ideas and skills which create products, incomes and profits.

Capital refers to the man-made resources which assists human resources in the production of goods and services. In economics, capital refers to physical capital and not financial capital. Physical capital is the ‘tools of trade’, the machinery and equipment that is required to produce goods and services. Examples of capital include the pen used by a journalist to write a story, an accountant’s computer, a truck used to haul ore at a mine site and a crane that is used to help construct a building. An important type of capital is **social overhead capital** - this is the basic infrastructure of the economy, such as transport and communications, power and water supply, schools and hospitals. This essential infrastructure is usually supplied by the government.

Capital plays an important role in a modern economy. In economics, the creation of new capital goods is referred to as investment. Investment is not the purchase of shares or putting money into an interest bearing deposit. Investment is the creation of new machinery, new buildings, and new roads. Investment is seen as the engine

of economic growth. Modern industrial economies are characterised by high rates of investment. Providing workers with more and better capital equipment helps to increase productivity and raise living standards.

Microeconomics and macroeconomics

The subject matter of economics is usually subdivided into microeconomics and macroeconomics. **Microeconomics** deals with the economic problem from an individual or 'micro' point of view. The prefix 'micro' refers to a small perspective. Microeconomics attempts to understand how consumers and producers make decisions. Microeconomics studies how markets and prices work to allocate resources between all the competing industries in the economy. At the heart of microeconomics is the theory of demand and supply. Part One of this text (chapters 1-5) covers the most important aspects of microeconomics.

Macroeconomics deals with the economic problem from society's point of view. The prefix 'macro' refers to a large perspective. Macroeconomics is concerned with the performance of the whole economy. It focuses on total economic activity in terms of total production, total employment and the overall price level. The two most important parts of macroeconomics concern the theory of economic growth and business cycles. Economic growth is important because it determines a nation's standard of living. Economies also experience fluctuations in economic activity - the business cycle - which affect a country's rate of inflation and unemployment. The 'king' of economic indicators is GDP - Gross Domestic Product. This measures the total value of final goods and services produced in an economy. The other two key macroeconomic indicators are the inflation rate and the unemployment rate. Part Two of this text deals with the important aspects of macroeconomics.

Review Quiz

1. **Define economics.**
2. **What is the economic problem?**
3. **What are the three basic economic questions?**
4. **What are the three main types of resources?**
5. **What are the two main branches of economics?**
6. **How does the Covid pandemic illustrate the economic problem?**

1.2 The science of economics

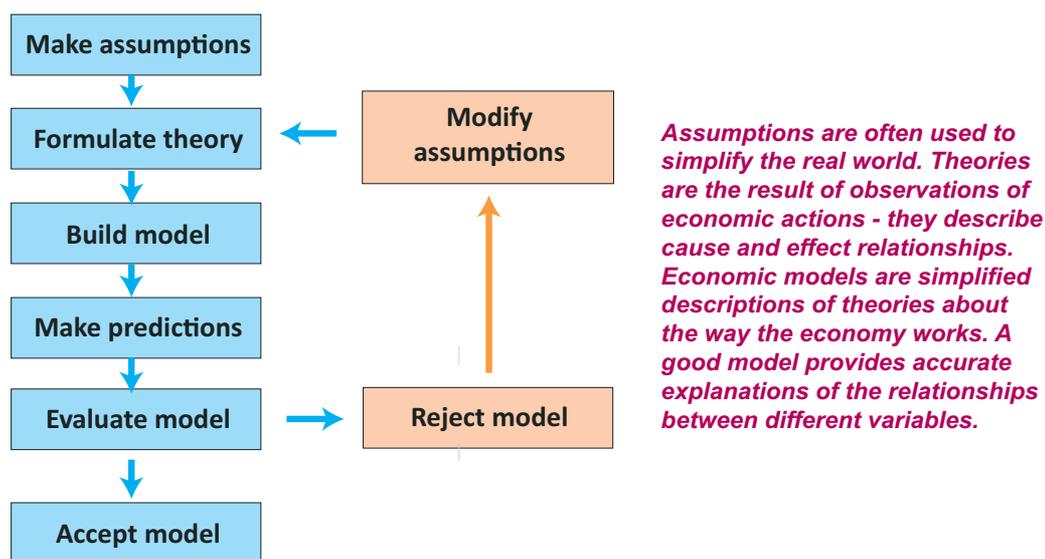
Economics is a **social science**. It studies the behaviour of people and the choices they make in response to the economic problem. Economics is a decision making science - it is particularly concerned with analysing and explaining decisions concerning production, consumption and resource use. Economics differs from the physical sciences, such as chemistry and physics, in that it cannot conduct controlled experiments. It does, however, use a logical set of processes (the **scientific method**) to identify the principles that govern economic behaviour in society.

The scientific method begins with observation and hypothesis. An economist might want to analyse household petrol consumption over time. Some important variables affecting petrol consumption would be the price of petrol, consumers' income, and the price of other related goods, such as cars and public transport. The effect of each independent variable on petrol consumption must be analysed separately to determine its relative importance. For example, we could hypothesise that people purchase more petrol when its price falls - a negative relationship; or that people buy more petrol when the price of cars fall. Our hypotheses are valid only if other independent variables are kept constant. This is an example of the **ceteris paribus** assumption. This is a Latin term which means 'all other things constant'. We could conclude that the price of petrol and the quantity of petrol consumed is a negative relationship, as long as other variables affecting petrol consumption do not change.

Economic theory concerns explaining cause and effect between two or more variables. If variables A, B and C all affect variable Y, we must first investigate the effect of variable A by holding B and C constant; then we would analyse the effect of variable B by holding A and C constant and then variable C by holding A and B constant. We are using the ceteris paribus assumption to isolate the cause and effect of each separate variable. Economists develop models to derive their theories about how the economy works.

An **economic model** is a simplified representation of economic reality showing the relationship between certain economic variables. Using simplified models enables economists to determine cause and effect. The test of a 'good' model is its ability to predict behaviour. Economic theories focus on the most important variables that determine economic behaviour. This is referred to as abstraction. All unnecessary detail is removed so that the model represents a simplification of reality. A simple

Figure 1.2 Economic models



analogy of a model is a map. A road map includes only the essential information required to enable a traveller to get from one destination to another. As a traveller's model, the map simplifies the task of getting from point A to B. Figure 1.2 summarises how the scientific method is used to build models in economics. The usefulness of an economic model or theory lies in its ability to predict events accurately. If the model's predictions are verified through observation and data collection, then the model is considered a good one. If not, then the model must be rejected and reformulated.

One of the important assumptions used by economists to explain human behaviour is that of **rational self-interest**. This means that economic decisions are based on a person following a logical process in order to compare the costs and benefits of

Economists assume that people are rational and respond to incentives. A rational person is someone who compares the costs and benefits of a decision before acting. Rational people respond to incentives.

decisions. A decision is considered rational as long as the benefit exceeds the cost. I will not purchase a good unless the benefit I get is greater than my cost. Price is a convenient way to measure and compare benefits and costs. If the price of a good rises, then for some people the higher cost will exceed their expected benefit and they will not consume the good.

People will respond to incentives that affect the cost and benefits of a particular action. For example if the penalties for committing crime increase, then *ceteris paribus*, we would expect a decrease in crime. Economists believe that rational self-interest is a very good predictor of human behaviour. In fact, the model of demand and supply that is used to determine price in competitive markets is an excellent application of the cost/benefit approach.

Positive and normative economics

Economists not only develop economic theories and models to explain economic behaviour but they also formulate economic policy. Testing and developing economic theory is known as **positive economics**. Essentially, positive economics is concerned with 'what is' in the economy. Economics also deals with 'what should be' which involves personal opinion and value judgments. This is the domain of **normative economics**. Economic policy, while based on economic theory also involves normative economics. This is why economists will often disagree about economic policy. Positive economic statements can be tested objectively. What is the current unemployment rate? What would happen if tariffs are removed from imported cars? What effect will a sales tax have on the wine industry? The answers to questions such as these are the subject of positive economics because they are testable using economic data.

Normative statements, on the other hand, are subjective statements which reflect opinions rather than facts, so they cannot be tested objectively. Normative statements often state 'what should be'. A normative statement involves a **value judgment** - an opinion that one situation is preferable to another. Opinions might appear logical, but they include a personal viewpoint which cannot be readily tested. Is the unemployment rate too high? Should the government protect domestic industry from foreign competition? Should the government tax carbon emissions? Each of

these is a normative question – they invite an opinion. The two statements below highlight the difference between positive and normative perspectives. Economists can test positive statements, but cannot test normative statements because they are value judgements.

- “...if the government increases the sales tax on tobacco, people will purchase fewer cigarettes”. This is a positive economic statement and can be tested. It is logically derived from ‘the law of demand’, which states that people purchase less of a commodity when its price rises.
- “...the government should increase the tax on cigarettes”. This is a normative statement made by a person who believes that higher cigarette taxes would be a good way to reduce tobacco consumption and improve the health of the population.

It is the role of the economist to make positive statements about economic behaviour. Positive statements can be tested and used to build theories and models which can then be put into practice in developing policies from which everyone in the community can benefit. Economists can also express their opinion about economic issues and economic policy by making normative statements.

Review Quiz

1. **What is an economic model?**
2. **Explain the meaning of the ‘ceteris paribus’ assumption?**
3. **What is meant by ‘positive economics’? Provide two examples of a positive economic statement.**
4. **What is meant by ‘normative economics’? Provide two examples of a normative economic statement.**

1.3 Scarcity, choice and opportunity cost

The economic problem is the problem of **relative scarcity** - resources are limited relative to society’s unlimited wants. The economic problem applies everywhere, to everyone and for all time. It applies to individuals and to the community. It even applies to the wealthiest of individuals, such as Mark Zuckerberg, the cofounder of the social-networking website Facebook. Even though Mark is a billionaire, he still faces a time constraint and he still must make choices. The economic problem also applies to wealthy economies such as Australia. There are thousands of doctors in Australia, yet people are still forced to wait for elective surgery at public hospitals. It is important not to confuse scarcity with poverty. Poverty can be reduced and even eliminated over time as a country’s standard of living increases. But rising living standards cannot eliminate the problem of scarcity. The economic problem is ongoing and can never be ultimately solved. Once we satisfy one want, there will always be another to take its place.

Opportunity cost

Every day, individuals make hundreds of choices - what to wear, how to get to school or work, what to buy for lunch, whether to study or go to training for sport. Make a list of five decisions you have made today that involved a tradeoff. What decisions did your family make today that involved a tradeoff? What federal or state government decisions were reported in the media? What was the opportunity cost in each case?

The environment was once viewed as a **free good**, but as world population has increased, environmental goods have become more scarce. Many species of plants and animals are close to extinction as the pace of economic development has increased. In Australia, the demand for water has increased relative to supply. Most capital cities in Australia have imposed water restrictions in order to cope with the increasing scarcity of water. Part of the reason for the shortage of water is that the price of water has been kept very low. An economist would say that this gives the wrong signal or incentive to consumers - water is viewed as a relatively free good. If the price of water was increased in Australia to reflect its true scarcity value, then people would use it more carefully and water restrictions would no longer need to be imposed.

Simply stated, the economic problem means that there is not enough of everything for everybody! Relative scarcity means we are constantly forced to make choices between alternative uses - individuals decide how to allocate their income; societies must decide which goods and services will be produced and which resources will be used. The role of the economist is to study how and why people and groups make choices when confronted by relative scarcity. Making choices involves a trade-off. Spending \$20 to go to the movies means that you cannot spend it to do other things.

Every decision involves a choice between one course of action and another. In other words, every choice involves a **trade-off**, which means that every choice involves a cost. We often think of the cost of a good or service in dollar, or monetary terms, but this does not give a true indication of the true cost. The true or real cost of any decision should measure the value of the alternatives which have been foregone.

There is no such thing as a 'free lunch!'

The expression "there is no such thing as a free lunch" reflects the relationship between scarcity and opportunity cost. If the government staged a free concert in the city, does that mean there is no cost? While the concert may be free for people to attend, from society's perspective, resources have been used to stage the concert. These scarce resources could have been used to provide other goods and services. Just because the concert has a 'zero' price does not make it a 'free good' - there is still an opportunity cost.

Opportunity cost is the term used to represent the real or economic cost of a decision. It is best defined as the value of the best alternative that you give up. For example, the \$1,000 used to purchase a new mobile phone could have been used to buy a laptop. Opportunity cost can be measured in monetary terms but it is important to think of it in terms of the actual opportunities that have been given up. By choosing the mobile phone, we have foregone the opportunity to purchase other goods, such as a laptop.

The value of time is an important part of opportunity cost. The opportunity cost of going to the movies includes more than just the price of the movie ticket! It includes the value of the two hours that you give up to watch the movie. If McDonalds announced that on a particular day they would give away free hamburgers, does this mean that the opportunity cost of consuming a hamburger would be zero? The answer is no - while the monetary cost is zero, you would have to sacrifice your valuable time waiting in the very long queue. Who would be more likely to stand in the queue - a student or a business executive? You would expect to see more students because the value of their time would be far less than someone earning a high salary. Suppose you are choosing between three different alternatives: A, B or C. If you choose A then the opportunity cost is either B or C, whichever is ranked highest.

Review Quiz

1. *Why will the economic problem always be a part of life?*
2. *Why are most things relatively scarce?*
3. *Why do choices involve trade-offs?*
4. *Define opportunity cost.*
5. *Why is there no such thing as a free lunch?*

The opportunity cost of a university degree

What is the opportunity cost of a university degree?

Suppose a student spends \$15,000 in HECS fees and textbooks for each year of study. Rather than going to university the student could have earned \$45,000 per year working in hospitality. The annual cost of rent, food, clothing and petrol while studying is estimated at \$15,000 per year. what is the total opportunity cost of attending university for a three year degree?

Do we include all these costs? We include the costs of fees and textbooks and the opportunity cost of not working, but we do not include the costs of rent, food etc since these would occur whether the student was attending university or not.

<i>Opportunity cost of money spent on fees and texts</i>	<i>\$45,000</i>
<i>Opportunity cost of university time (three years working)</i>	<i>\$135,000</i>
<i>Total opportunity cost over three years</i>	<i>\$180,000</i>

Allocating scarce resources

What is the best way to allocate society's scarce resources? The economist compares the benefits of using resources against the cost. For example, the following table lists the benefits and costs associated with allocating resources to public hospitals. Each hospital costs \$50 million to build, while the total benefits of increasing the number of hospitals increases but at a declining rate.

No. of Hospitals	Total Benefits \$m	Total Costs \$m	Net Benefits \$m
1	100	50	50
2	180	100	80
3	240	150	90
4	280	200	80
5	300	250	50

For example, the total benefits of one hospital equals \$100 million, the total benefits of two hospitals is \$180 million, and for three it is \$240 million. Why don't the benefits increase at a constant rate? Its simply because as you consume more of something the extra or additional benefit you get declines. It is a principle that applies to everything that you consume. Its called the **principle of decreasing marginal benefit**. The fourth column in the table calculates the net benefits from each hospital - the difference between total benefits and total costs. Notice where the net benefits are largest. What is the correct or optimal number of hospitals? Should we keep allocating resources as long as total benefits exceed total costs? Should we build five hospitals? The answer is no. The correct answer is that we should keep allocating resources until we maximise net benefits. The economically efficient number of hospitals in this example is three. Because resources are scarce, then we should allocate them in such a way as to get the best value from their use. Net benefits are maximised at \$90 million with three hospitals.

Economists like to use **marginal analysis** when making decisions about resource use. This mean calculating the marginal or additional benefit of each new hospital and compare it with the marginal cost (MC). Note that the marginal benefit of additional hospitals falls. The marginal benefit (MB) of the first hospital is \$100 million, the MB of the second hospital is \$80 million and the MB of the third hospital is just \$60 million. The marginal cost (MC) of each hospital is constant at \$50 million. It makes sense to allocate resources as long as the marginal benefits (MB) exceed the marginal costs (MC). In the example above, this occurs with three hospitals - MB equals \$60 million and MC equals \$50 million. It is inefficient to build the fourth hospital because the MB (\$40 million) is less than the MC (\$50 million). Comparing costs and benefits at the margin is a distinguishing feature of economic analysis. The cost benefit framework is a simple but very effective method to make decisions when allocating scarce resources.

No of Hospitals	Marginal Benefits \$m	Marginal Costs \$m
1	100	50
2	80	50
3	60	50
4	40	50
5	20	50

1.4 The production possibility frontier

An important economic model that economists use to illustrate the economic problem and the concept of opportunity cost is the **production possibility frontier** (PPF) model. The PPF shows all the combinations of goods and services that can be produced by an economy given the available resources and the level of technology. The model has some important assumptions:

- resources are fixed
- technology is fixed
- the economy produces just two goods - pizzas and cars

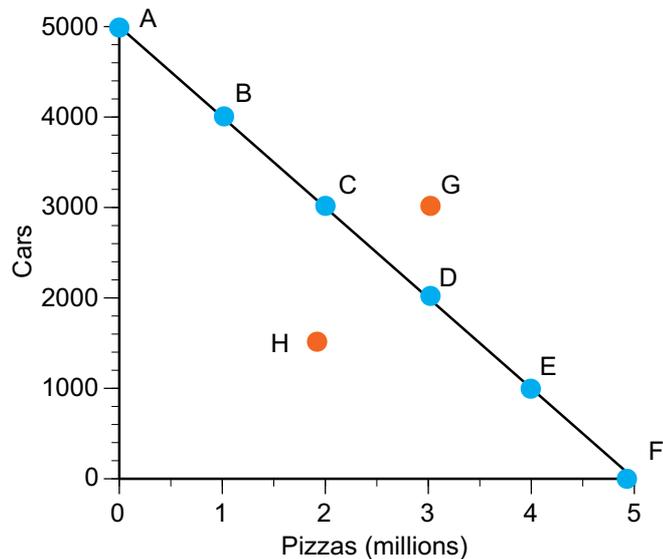
The table below illustrates the combinations of pizza and car production using the economy's scarce resources. If we convert this information into a graph then we obtain the production possibility frontier or curve. This is shown in Figure 1.3. Car production is measured on the vertical axis and pizza production is measured on the horizontal axis. The economy can produce anywhere along the frontier from point A to point F. At point A, all resources are being used to produce cars (5,000) and pizza production is zero. At point F, all resources are now being used to produce pizzas (5 million) and car production is zero.

Possibility	Pizzas (million)	Cars
A	0	5000
B	1	4000
C	2	3000
D	3	2000
E	4	1000
F	5	0

Notice the frontier illustrates the trade-off between producing pizzas and cars. To produce more pizzas, car production must decrease. This is because of scarcity - in other words, the frontier has a negative slope. The frontier also provides a measure of opportunity cost. The opportunity cost of producing each 1 million units of pizzas is 1 thousand cars. Alternatively, the opportunity cost of producing each 1,000 cars is 1 million pizzas. What is the opportunity cost of just 1 car? The answer is 1,000 pizzas. Alternatively we can determine the opportunity cost of producing just 1 pizza - it is 0.001 car. In this simple example, the opportunity cost along the frontier is constant and the PPF is a straight line. Can we produce at a point like G, outside the frontier? The answer is no, because we do not have enough resources. A point like H which is inside the frontier is attainable but it is inefficient. A point such as H

Figure 1.3 Simple production possibility frontier

The production frontier shows the maximum output for an economy given fixed resources and technology. The frontier illustrates scarcity, trade-offs and opportunity cost. The opportunity cost of 1 car is 1000 pizzas. This frontier is a straight line because opportunity cost is constant.



would be associated with unemployed resources. It would be possible to increase the production of both goods, so point H is inferior compared to points on the frontier.

Will the PPF always be a straight line? Only if the opportunity cost between the two goods is constant. The normal shape for the PPF is to be 'bowed' outwards. This is because the opportunity cost of increasing the production of one good in an economy with scarce resources normally increases. It is referred to as the **law of increasing opportunity cost**. Constant opportunity cost means that resources are equally suited to producing all types of goods. In our example, it would mean that our resources are equally suited to producing both cars and pizzas. This would be highly unlikely. In reality, some resources would be better at making pizzas, while other resources would be more suited to manufacturing cars. When the productivity of resources differs between types of goods, then the PPF will be 'bowed' outwards. This is illustrated in the second example below.

In this case the opportunity cost of the first 1 million pizzas is 400 cars (point A to B). But from point B to C the opportunity cost of the next 1 million pizzas increases to 600 cars, and from point C to D it increases to 1,000 cars. The opportunity cost of the fifth million pizzas is 1600 cars. This demonstrates the law of increasing opportunity cost - as production increases, the opportunity cost increases. Figure 1.4 illustrates the typical 'bowed' out production frontier. Is there a best point to be on the production frontier? Any of the points A to F can be regarded as best, since each of these points is production

Possibility	Pizzas (millions)	Cars
A	0	5000
B	1	4600
C	2	4000
D	3	3000
E	4	1600
F	5	0

efficient - resources are not being wasted. Ultimately, society must choose which combination of pizzas and cars it wants to consume. The particular combination of pizzas and cars that maximises net benefits for society is known as the economically efficient point. Will society automatically choose this point? This is a very important question and we will be able to show that a free market economy will automatically produce at this point. Opportunity cost is involved in every single economic decision we make, so the production frontier is an important economic model. Imagine that the goods shown in figure 1.4 were not pizza and cars, but schools and hospitals, or consumer goods and capital goods. The principle still applies - to be able to build more schools, the government would have to forgo some hospitals. Every decision involves an opportunity cost because resources are scarce and there will always be a **tradeoff** - when a choice is made, something is given up.

The production possibility frontier illustrates the basic economic problem - scarcity and choice. A movement along the frontier measures the opportunity cost of changing production.

What happens to our model if we relax our initial assumptions regarding resources and technology? Figure 1.5 illustrates two possibilities. In panel a, the curve has shifted outwards along the car axis, perhaps as a result of an increase in the quantity of resources available for car production or the introduction of new technology in manufacturing cars. If instead there was an advance in pizza technology, then the frontier would move out along the horizontal axis. Panel b illustrates an outward shift of the whole frontier - more of both goods can be produced - there must have been an increase in the quantity or quality of resources that affects the production of both cars and pizza. Over time, an economy's production frontier will shift outwards as resources, such as the labour force and capital stock increase.

Figure 1.4 The law of increasing opportunity cost

This PPF is bowed outwards because of the law of increasing opportunity cost. As more pizzas are produced, the opportunity cost increases since resources are not equally productive at producing both cars and pizzas.

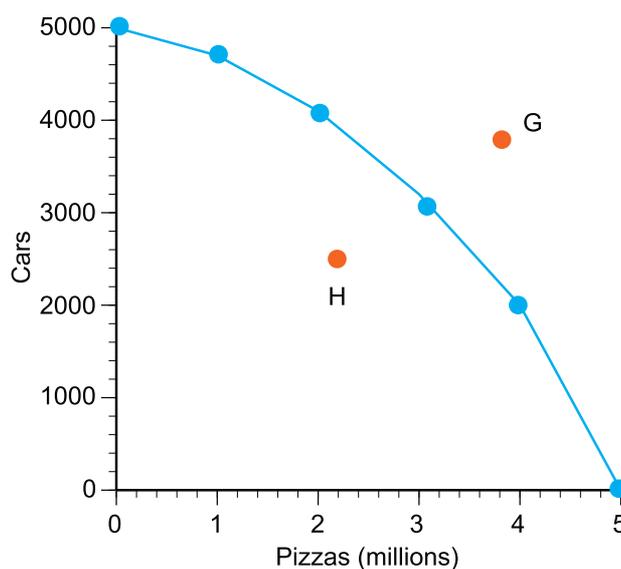
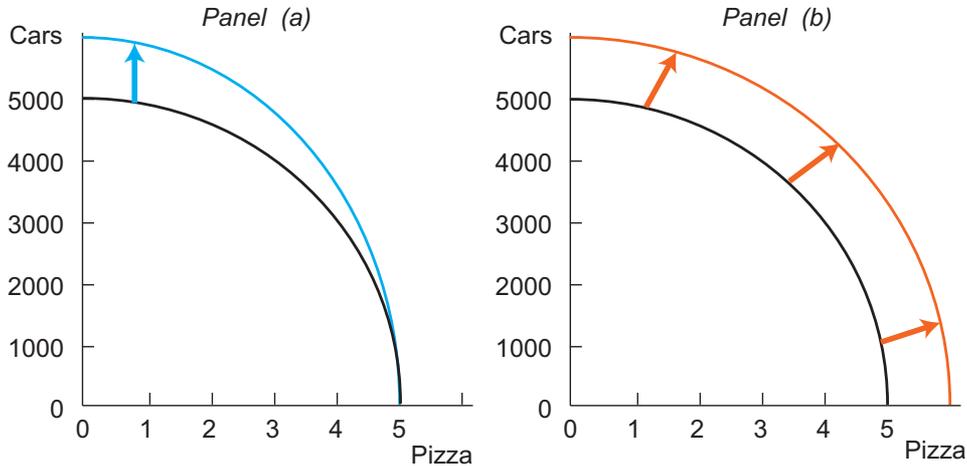


Figure 1.5 Changes in the PPF

Panel (a) shows an improvement in production technology for cars - the frontier shifts along the car axis only. Panel (b) shows an increase in the quantity of resources (both labour and capital) - the whole frontier shifts out to the right.



Economic growth

The production possibility frontier can be used to illustrate economic growth. Economic growth refers to an increase in the capacity of an economy to produce goods and services as illustrated by panel b in figure 1.5. Economic growth can occur as a result of an increase in the quantity of resources or an improvement in their quality. For example an increase in the labour force results from population growth. The stock of capital equipment increases over time as firms invest in machinery and the construction of new factories and buildings. The creation of a new iron ore mine will increase the quantity of natural resources. How do the quality of resources improve? Productivity is a measure of quality - how much output is produced from a given set of inputs. The quality of labour resources will improve through higher levels of education and training. The quality of capital resources can be improved through the application of technology.

When economies produce more goods and services it enables a higher standard of living which is the ultimate economic objective. But pursuing economic growth also involves a tradeoff - a tradeoff between present and future consumption. If we use most of our resources to produce consumer goods today, then that will mean potentially less consumption for the future. Sacrificing some current consumption enables resources to be diverted and used to produce capital goods. Reducing current consumption increases savings which can be channeled into investment. Investment is seen as the 'engine' of economic growth. Investment is the creation of capital goods. Capital goods are man made goods that are used in the production process. They include machinery, factories, computers and transport networks. Higher economic growth enables higher future living standards but there is an opportunity cost - lower consumption today.

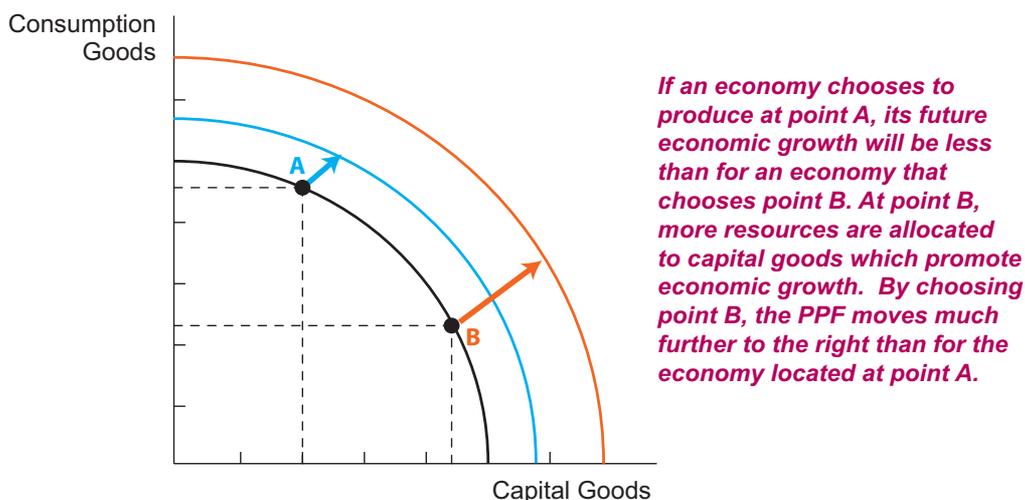
Figure 1.6 Capital goods and economic growth

Figure 1.6 above helps to illustrate this tradeoff between present and future consumption. The PPF model below illustrates the choice between producing consumption goods or capital goods. If an economy chooses to locate at point A, where more resources are devoted to producing consumption goods, then the frontier only moves a short distance to the right. This reflects a lower rate of economic growth. If the economy instead chooses point B on the initial PPF, then, over time, the frontier moves much further to the right, indicating a faster rate of economic growth. In other words choices made today can have a significant impact on future living standards.

Review Quiz

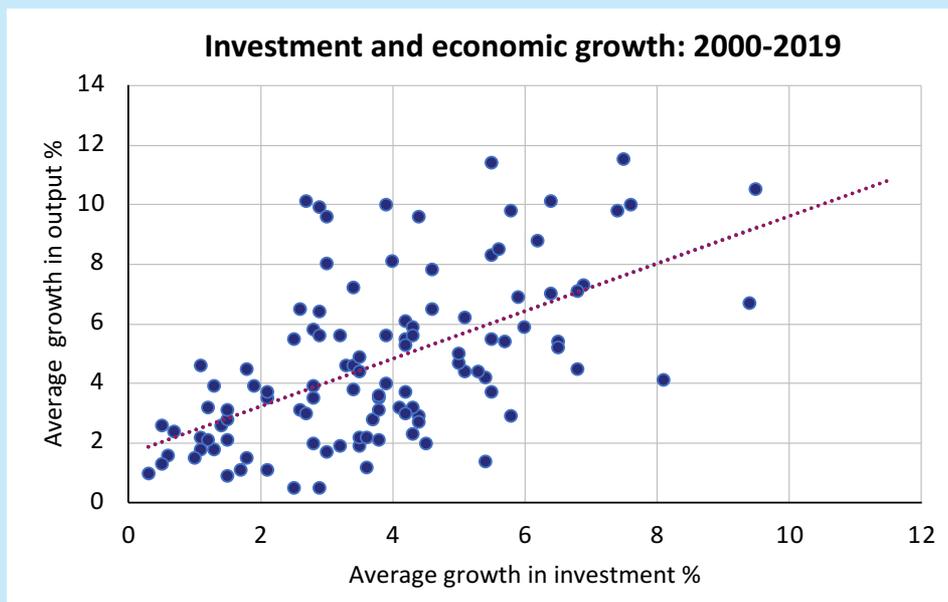
1. *What does a production possibilities curve or frontier illustrate?*
2. *State the three assumptions of the PPF model.*
3. *Why does the frontier have a negative slope?*
4. *What is the law of increasing opportunity cost?*
5. *What can cause the PPF to shift to the right?*

1.5 The economic system

Like individuals and groups, nations also face the economic problem. Collective wants such as education, health and public transport are unlimited, but resources are still relatively scarce. Thus a choice must be made as to which wants will be satisfied. An **economic system** is the way in which a country's resources are allocated to deal with the economic problem. It includes the institutions such as law and order, rules and regulations, and accepted practices for the production and distribution of goods and services.

Correlation of investment and growth

Is there a correlation between investment and economic growth? The graph below shows a scatterplot of countries showing their average annual growth in output and their average growth in investment. It would appear that there is a strong positive relationship between the two - countries that invest in capital resources have higher rates of economic growth.



An economic system must answer three basic questions concerning the economic problem. These questions are:

- what and how much to produce?
- how to produce?
- for whom to produce?

These questions determine the allocation of resources in the economy and the distribution of income. Should society allocate most of its resources to consumer goods in order to maximise present living standards or should society allocate more resources to capital goods? Should the government provide public hospitals and schools? Should society allow private ownership of resources (capitalist system) or should the state own all resources (socialist system). Should market forces be allowed to allocate resources using the price system, or should a planning authority make all decisions. These are important questions which determine the type of economic system a nation will choose to resolve the basic economic problem of scarcity.

In some economies, resources are owned privately and all decisions are made by the owners of resources acting in their own self-interest. These characteristics describe

a **market economy**. An economy in which resources are owned collectively, and decisions are made by a planning authority is called a **command economy**. Capitalist economies, such as Australia and the United States are predominantly free market economies. Most decisions concerning the production of goods and services is determined by free market forces. Most economies today combine elements of both market and planned economies and can therefore be called **mixed economies**. Private markets are very efficient at allocating resources for most goods and services but governments can also play an important role in providing for many social goods and services such as health, education, law and order.

In a mixed economy both the government and the private sector determine the allocation of resources. In Australia the private sectors accounts for around 75 per cent of production.

Economies can also be characterised by the methods of decision-making they use to answer the above three questions. A pure market economy is one in which the forces of supply and demand determine the what, how and for whom questions. The invisible hand of the market allocates resources between competing uses, and determines the distribution of income. The consumer is considered sovereign or king in the market economy since their spending determines production. The what, how and for whom decisions in planned economies are made by a central authority which regulates production and distribution for the benefit of all members of society. In Australia, markets allocate resources for most goods and services such as food, housing, clothing, motor vehicles, entertainment and recreation. The government sector accounts for around 30 per cent of total production and this is evident in the health and education sectors.

Review Quiz

- 1. What is the role of an economic system?**
- 2. State the three questions an economic system must address.**
- 3. Distinguish between a market and a command economy.**
- 4. What is a mixed economic system?**

2 Demand and supply



Learning Objectives

In this chapter you will learn about:

- *different types of markets*
- *the law of demand*
- *the factors affecting demand*
- *the law of supply*
- *the factors affecting supply*
- *the concept of market equilibrium*
- *the price mechanism and how it clears market surpluses and shortages*
- *the effect of changes in demand and supply on market equilibrium*

2.1 The role of markets

Economic systems exist to deal with the economic problem. An economic system tries to coordinate the production and distribution of goods and services to satisfy the wants of society. Economic systems vary from 'free market' to 'planned', but regardless of the type they must all answer the following fundamental questions:

- **What** goods and services will be produced and in what quantity?
- **How** will the goods and services be produced in terms of production technique and types of resources?
- **For whom** will the goods and services be produced?

In this chapter, we outline how these questions are answered in a market economy. Markets are one way to coordinate economic activity - they allocate resources in order to resolve the economic problem. Markets help to allocate scarce resources to satisfy the many competing wants in an economic system. Markets coordinate economic activity and provide incentives for both consumers and producers. Economists believe that markets are an efficient way to deal with the economic problem because they do not require any resources to function. The market coordinates decisions between buyers and sellers in a decentralised way. Markets work because when people engage in exchange, they benefit.

A **market** is said to exist when buyers and sellers exchange goods, services or resources. A market consists of three important elements:

- buyers (demand)
- sellers (supply)
- something to exchange (a good, service or resource)

A market is also characterised by voluntary exchange. This means that buyers and sellers are not forced to participate in exchange, but do so willingly. This is important because buyers and sellers might meet face-to-face, but could also exchange goods and services by mail, telephone, or the internet. Buyers and sellers may also deal with one another through an intermediary or middle-man, as happens in the stock market, where transactions are usually handled by brokers on behalf of their clients.

Product markets deal with the buying and selling of goods and services. In a product market, consumers represent the demand side of the market, while producers or firms represent the supply side. Firms produce goods and services and sell them to households (consumers). **Factor markets** deal in the buying and selling of factors of production or resources such as the labour market, the capital market and natural resource markets. In a factor market, households sell their resources to firms. In a factor market, households represent the supply side of the market, while firms represent the demand side.

Markets can also be classified according to the intensity of competition in the market. A **competitive market** is characterised by:

- a large number of buyers and sellers

- firms are price takers
- very similar (homogeneous) products
- easy entry into the market (no barriers to entry or exit)

In a competitive market, price is determined by the interaction between buyers and sellers. No individual buyer or seller can influence the market price - this means that there is no market power. Firms are called price takers because they must take the price that is established by the market. There are many examples of competitive markets - agricultural markets, fruit and vegetables, cafes and hair dressing salons. The small business sector satisfies many of the assumptions of a competitive market. Any market with a large number of relatively small firms selling very similar goods and/or services and with easy entry conditions is a competitive market. A market that is not competitive is called an **imperfect** or non-competitive market. An imperfect market is characterised by:

- a small number of firms
- product differentiation
- firms are price setters - they have market power
- entry into the market is restricted

A monopoly market is an extreme type of imperfect market with just one dominant firm. An oligopoly is a market with a few dominant firms. Firms with market power can set their own price - they are called price setters. An imperfect market is characterised by product differentiation where firms try to make their products 'look different' in the eyes of consumers and use barriers to entry to make it difficult for new firms to enter the market. In Australia there are many examples of imperfect markets. Coles and Woolworths are a virtual duopoly in the grocery market. The mobile phone services market is a classic oligopoly dominated by three firms: Telstra, Optus and Vodafone.

The role of prices

In the market system the three key economic questions are answered by the price mechanism - the interaction of buyers and sellers in the market. In a market economy, the consumer is king (consumer sovereignty), meaning that consumers determine what will be produced, and how much will be produced. Consumers signal their tastes and preferences to producers by casting their dollar votes when they buy goods and services. Producers respond to changes in demand signalled by consumers. For example, if striped shirts become more popular than plain shirts, then shirt producers would increase the production of striped shirts and reduce the output of plain shirts. In the motor vehicle market sales of SUVs have soared while sales of large sedans have slumped as a result of changes on consumer tastes.

In the market economy, the how to produce question is answered by producers. Like consumers, producers are guided by the principle of self interest. To operate profitably, firms have to operate efficiently and minimise costs. Producers will compare the prices of inputs when deciding what techniques of production to use.

The market system provides an incentive for the producer to become more efficient and lower costs in order to increase profits. Price also determines the 'for whom' question. The rewards of production reflect the price which the market is willing to pay for resources. Wages and salaries are the reward for labour; owners of natural resources receive rent; the owners of capital receive dividends (or interest in the case of money capital); and the owners of entrepreneurial skills receive profits. The amount of income earned by resource owners generally reflects the scarcity of the resource they have provided. Skilled workers, for example, are paid a higher wage than unskilled workers. Doctors and engineers will receive a higher income than clerical staff or sales staff. Musicians and entertainers such as Taylor Swift and Ed Sheeran earn millions of dollars because of their special skills. We will now turn our attention to how competitive markets determine prices. We will focus on the most important model in microeconomics - the model of demand and supply.

2.2 The demand side of the market

Demand refers to the buying intentions of consumers. The quantity demanded of a good or service is the quantity that consumers are willing and able to purchase, at a particular price and at a particular time. Demand is not the same thing as a want. Many people may want a luxury yacht, but only a few are willing and able to purchase the yacht. Demand refers to the actual buying intentions of consumers. I might want a Ferrari, but I actually purchase a Mazda 3 because that is what I can afford.

An important law in economics is the **law of demand** - as the price of a good rises, people buy less of it, *ceteris paribus* (holding other factors constant). The law of demand describes a negative relationship between price and quantity demanded. What is the explanation for the law of demand? There are two important reasons.

- The **income effect** - when the price of a good rises, consumers are not willing to buy as much of the good because their real income or purchasing power has decreased. If you have \$100 in income and the price of a pizza is \$10 then your real income is 10 pizzas. If the price of pizzas increases to \$20, then your real income halves to just 5 pizzas. When your real income falls you are poorer and therefore you will purchase less. The income effect works in both directions - when the price of a good falls, your real income rises and you will purchase more.
- The **substitution effect** - when the price of one good rises, other goods become more attractive to buyers because they are relatively cheaper. An increase in price will cause consumers to switch to relatively cheaper substitutes. For example, an increase in the price of pizza will cause some consumers to switch to other types of fast food. On the other hand, a decrease in the price of pizza, will now make substitute goods relatively more expensive and consumers will purchase more pizza.

Notice that both the substitution effect and the income effect work together to reinforce the law of demand. Are there any exceptions to the law of demand? The

simple answer is No! The law of demand holds for all goods and services - as long as the **ceteris paribus** (keeping other factors constant) condition holds. Don't be fooled by people who claim that there are exceptions to the law of demand. For example, it is often argued that if a consumer buys an expensive brand rather than a cheap brand, this violates the law of demand. This is incorrect because we are dealing with two different goods. The consumer may use price as a signal of quality and have a preference for the more expensive brand. To break the law of demand, the consumer when given a choice of buying the same good at two different prices chooses to pay the higher price. When buying a good, would you refuse a discount? Of course not! There are no exceptions to the law of demand.

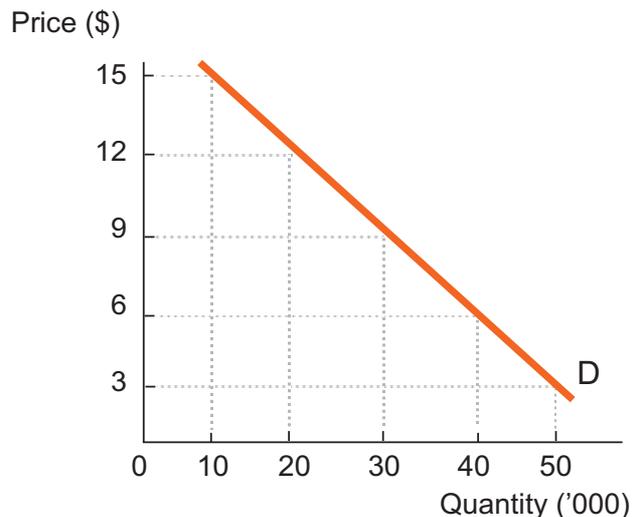
Of course, the law of demand varies in strength between different types of goods depending on how strong the income and substitution effects are. For example, the law of demand for petrol will be relatively weak. There are few close substitutes for petrol. If the price of petrol increases, consumers will find it difficult to substitute away from petrol. The law of demand for orange juice, on the other hand, will be much stronger. There are many close substitutes for orange juice such as apple, pineapple and grape juice. If the price of orange juice increases, then consumers can readily substitute into another fruit juice.

Figure 2.1 shows a demand schedule and a **demand curve** for pizza. A demand schedule is simply a table showing the quantity demanded of a good consumers are willing to purchase at various prices. Figure 2.1 shows the weekly quantity of pizzas that consumers are willing to buy at various prices. It is called a market demand schedule because it is the summation of all the individual consumers in the market. As we would expect, rational consumers are willing to buy more pizzas at lower prices than they are at higher prices.

Figure 2.1 The demand curve

The demand schedule and graph illustrate the law of demand - price and quantity demanded are negatively related, ceteris paribus. As price rises, quantity demanded falls; as price falls, quantity demanded rises.

Demand schedule	
Price (\$)	Quantity demanded
15	10000
12	20000
9	30000
6	40000
3	50000



We can convert the data from the schedule to a graph known as the market demand curve for pizza. The graph's axes represent price on the Y axis, and quantity demanded on the X axis. Note that the demand curve is negatively sloped (downward sloping to the right) reflecting the law of demand. As price falls, quantity demand rises and when price rises, quantity demanded falls. There are other factors apart from price, which may affect the demand for a good or service. These are all the factors that were held constant (*ceteris paribus* conditions) in deriving the demand curve. These non-price factors affecting demand are discussed in the next section.

Review Quiz

1. **What are the characteristics of a market?**
2. **Describe the feature of a competitive market.**
3. **State the law of demand.**
4. **What is the substitution effect?**
5. **What is the income effect?**
4. **Why does the demand curve have a negative slope?**

Non-price factors affecting demand

What are the key factors, other than price, that can affect demand?

- **Levels of disposable income**

Your level of income determines your budget - what you can and cannot afford. Consumers will normally purchase more of a good when their income increases. Most goods in the economy are referred to as normal goods. A normal good is defined as one where demand increases as income increases. An inferior good is a good where demand decreases as income rises. An example of an inferior good is a very low quality product such as a 'plain wrap' or 'home' brand product.

- **The price of related goods**

On most occasions, consumers can choose between a number of goods and services which satisfy the same wants. These are referred to as **substitutes**. For example, there is a wide range of fast food products on the market other than pizza. Consumers can choose from chicken, hamburgers, kebabs, noodles, or fish and chips - the list is very long and varied. If the price of pizza rises, the quantity demanded of pizza will fall and consumers will increase their demand for other types of fast food. There are many other examples of substitute goods such as tea and coffee, butter and margarine, orange and apple juice.

Many goods are also consumed with other goods - these goods are called **complements**. For example, computers require software; filing cabinets require document folders; cars require petrol; and the playing of tennis requires courts, racquets and balls. You might like to consume pizza with garlic bread or with a bottle

of coke. If the price of pizza rises, the quantity demanded of pizza will fall, and the demand for complements, such as garlic bread will decrease. Similarly, a rise in the price of computers will lead to a decrease in the demand for software while a decrease in the price of cars will lead to an increase in the demand for petrol.

- ***Tastes and preferences***

The tastes and preferences of consumers are an important determinant of consumer demand. The advertising industry plays an important role in affecting consumers' preferences and spending habits. Consumers have quickly embraced the new products/services of the digital age - from smartphones to Facebook and Uber. Sales of CDs quickly declined as consumer preferences shifted towards digital recordings. Similarly, demand for DVDs has declined as consumers switch to online streaming of movies. Many consumers now indicate a preference for environmentally friendly 'green' and organic products.

- ***Expectations of consumers***

If people expect conditions to change in the future, they may make decisions now rather than postpone them. For example, if the price of petrol is expected to rise in the future, then consumers will have an incentive to increase their purchases now to beat the price rise. This is rational behaviour. Expectations of a future price rise will increase demand now and shift the demand curve to the right. If you expected the price of petrol were to fall next week, then you would decrease your current demand and wait for the price to fall.

- ***Demographic factors***

The size and age composition of the population can have an important bearing on the pattern of demand. A growing population increases the market size for all goods and services whereas a change in the age profile will affect specific goods and services. For example, as the Australian population ages, the demand for child care facilities will decrease relative to the demand for retirement facilities. There is a growing demand for ocean cruises as the population ages and more people enter retirement age.

Changes in demand

We distinguish between two types of changes in demand:

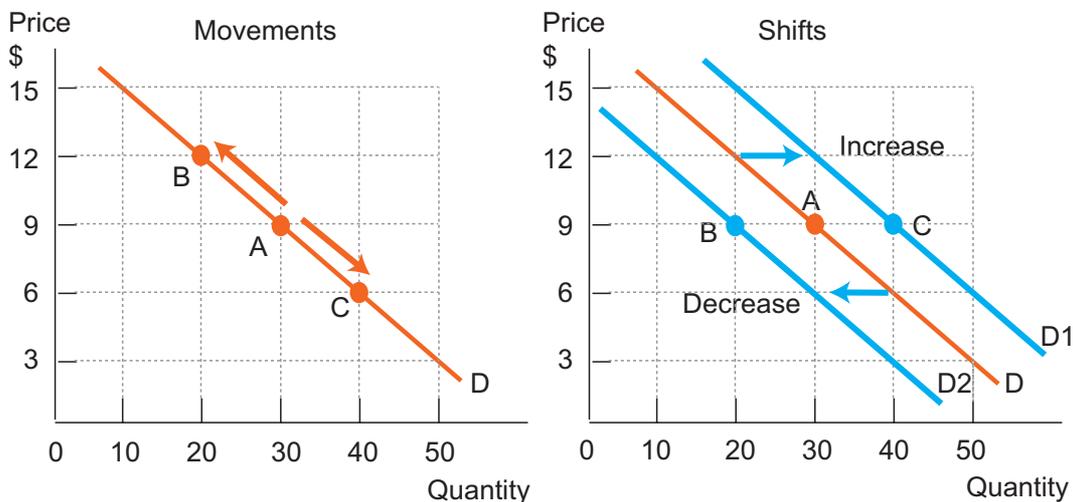
- a movement along the curve - caused by a change in price.
- a shift of the entire curve - caused by a non-price factor.

These changes are shown in figure 2.2. A change in the price of the good itself will lead to a movement along the demand curve. A change in price will cause a change in quantity demanded. For example, an increase in the price of a good will cause a decrease in quantity demanded whereas a fall in price will cause an increase in quantity demanded (panel A). It is important to remember that when price changes, we move along the curve. A change in price cannot shift the curve.

Figure 2.2 Changes in demand

A. A change in price causes a movement along the curve e.g. a rise in price decreases quantity demanded (and vice versa).

B. Increases or decreases in demand are shifts of the entire curve, caused by a factor other than the price of the good.



Changes in any of the other non-price (*ceteris paribus*) factors affecting demand will cause a shift in the entire demand curve. When non-price factors change, the result is a new demand curve. There are two types of shifts - an increase in demand occurs when the demand curve shifts to the right; a decrease in demand occurs when the demand curve shifts to the left (refer to panel B in figure 2.2). An increase in demand, for example, might result from any of the following events:

- an increase in consumer income for a normal good
- a decrease in consumer income for an inferior good
- a fall in the price of a complementary good
- an increase in the price of a substitute good
- a change in tastes and preference in favour of the good
- the expectation that price will rise in the future
- an increase in the number of consumers in the market

Review Quiz

1. What is the difference between a normal good and an inferior good?
2. Provide an example of two substitute goods and two complements.
3. Outline two factors that could cause an increase in the demand for coffee.
4. Outline two factors that could cause a decrease in the demand for pizza.

2.3 The supply side of the market

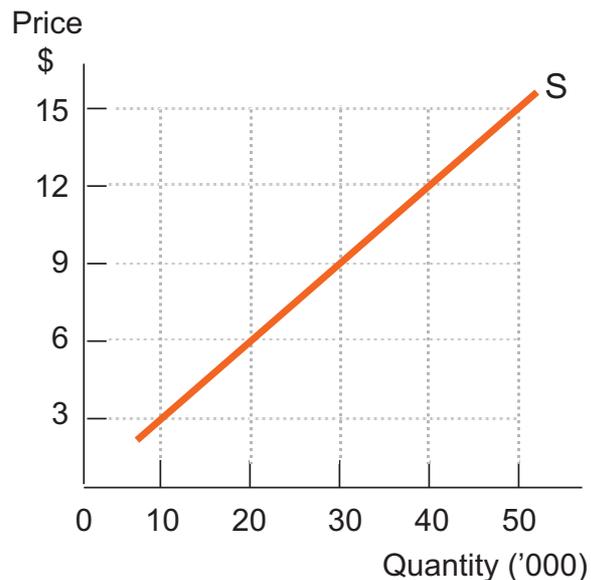
Supply represents the sellers or producers side of the market. **Supply** is the amount of a good or service that producers are willing and able to sell at a particular price and at a particular point in time. The relationship between the quantity supplied and the price of a good is a positive one. The law of supply states that as the price of a good or service rises, the quantity supplied will also rise. Notice that this is opposite to the law of demand. The law of supply also assumes that all non-price factors that may affect supply are held constant - the ceteris paribus assumption. What is the economic reason for the law of supply? Rational, self-interested producers would prefer to sell their output at a high price than at a low price because of the profit motive. If you are selling a good or service you would prefer to sell at the highest price possible. When firms increase their output they may also find that their production costs may increase which would require price to rise to maintain their profit margin.

Figure 2.3 depicts the supply schedule and the **supply curve** for pizzas. A supply schedule is simply a table showing the quantity supplied of a good producers are willing to sell at various prices. Figure 2.3 shows the weekly quantity of pizzas that producers are willing to sell at various prices. It is called a market supply schedule because it is the summation of all the individual producers in the market. As we would expect, rational producers are willing to sell more pizzas at higher prices than they are at lower prices. We can convert the data from the schedule to a graph known as the market supply curve for pizza. Note that the supply curve is positively sloped, reflecting the law of supply.

Figure 2.3 The supply curve

Supply schedule	
Price (\$)	Quantity supplied
15	50000
12	40000
9	30000
6	20000
3	10000

The supply schedule and graph illustrate the Law of Supply - price and quantity supplied are positively related, other things being equal. As price rises, quantity supplied rises.



Non-price factors affecting supply

There are other non-price factors which can affect the supply for a good or service. These are all the factors that were held constant (*ceteris paribus* conditions) in deriving the supply curve. The most important factors are the costs of production; technology; prices of other goods the firm can produce; the number of sellers; and expectations of producers.

- **Costs of production**

The price of resources such as labour, capital and raw materials determine the firm's costs of production. A supply curve can be thought of as a cost curve for the firm. Usually, a firm's largest costs are wages and salaries and the cost of purchasing raw materials. An increase in production costs will mean that for a given price, the firm will decrease its production. This will cause the supply curve to decrease - to shift to the left.

- **Technology**

Technology is knowledge about the techniques of production. If technology improves, then more output can be produced from the same quantity of resources. This means that the firm's costs of production will fall. Other things being equal, an improvement in technology will result in an increase in supply. The supply curve will shift to the right. The cost of many products including computers, household appliances and electronic devices has continuously fallen over time as a result of improvements in technology.

- **Prices of other goods**

Production is a process which involves combining productive resources to produce a final good. In many cases the same resources could be used to produce other goods. The producer will closely monitor movements in the prices of the goods he is capable of supplying so that he can take advantage of profit opportunities. In agriculture, for example a farmer may shift resources from wheat production to wool if the price of wool rises relative to wheat. A car manufacturer will decrease the supply of large cars if small cars become more popular.

- **Number of sellers**

If new sellers enter the market, then market supply will increase and the market supply curve will shift to the right. Sellers might be enticed to enter a market if profit opportunities are strong.

- **Expectations of producers**

Suppliers expectations of future conditions will affect supply. If a higher price is expected in the future, then firms will decrease their current supply in order to take advantage of future higher prices. Firms will make decisions about investing in plant and machinery on expected future prices. Expected high prices for iron ore, for example, will encourage increased exploration.

Changes in supply

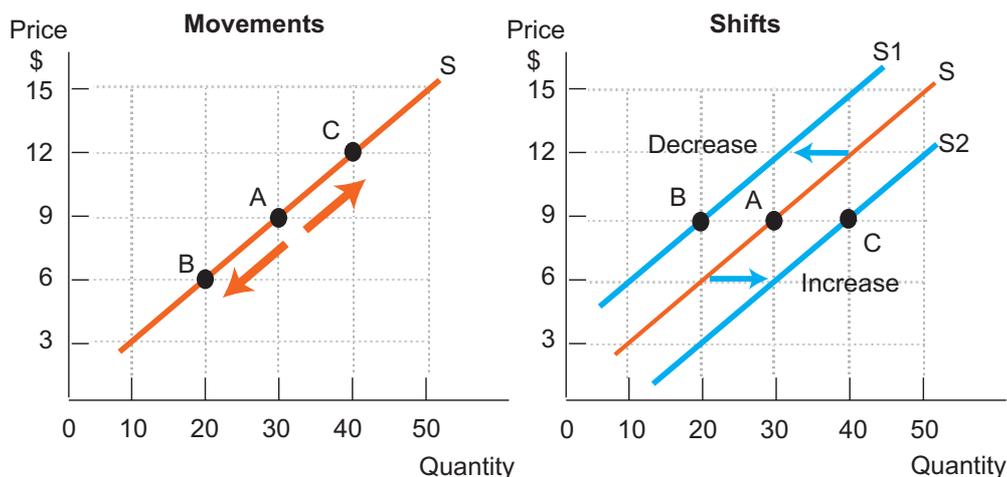
There are two types of changes in supply:

- A movement along the supply curve - caused by a change in price
- A shift of the entire supply curve - caused by a change in a non-price factor

These changes are shown in figure 2.4. Changes in the price of the good itself will lead to a movement along the supply curve. A change in price causes a change in quantity supplied. An increase in the price of the good will cause an increase in the quantity supplied while a fall in price leads to a decrease in the quantity supplied. It is important to remember that when price changes, we move along the curve. A change in price cannot shift the curve. Changes in any of the other non-price factors affecting supply will cause a shift in the whole supply curve. These factors were all held constant when the initial supply curve was drawn. Allowing these factors to change will result in a new supply curve. There are two types of shift - an increase in supply occurs when the supply curve shifts to the right; a decrease in supply occurs when the supply curve shifts to the left. An increase in the supply of a good will result from any of the following events:

- an improvement in technology
- a decrease in production costs (input prices)
- the expectation that prices will fall in the future
- an increase in the number of producers in the market

Figure 2.4 Changes in supply



A change in price causes a movement along the curve. A rise in price increases quantity supplied, while a fall in price decreases quantity supplied.

Increases or decreases in supply are shifts of the entire curve, caused by a factor other than the price of the good.

Review Quiz

1. State the law of supply.
2. Why would a seller prefer to receive a higher price than a lower price?
3. How would an increase in production costs affect the supply curve?
4. How would an improvement in technology affect the supply curve?
5. An increase in price will cause an increase in supply. True or false - explain.

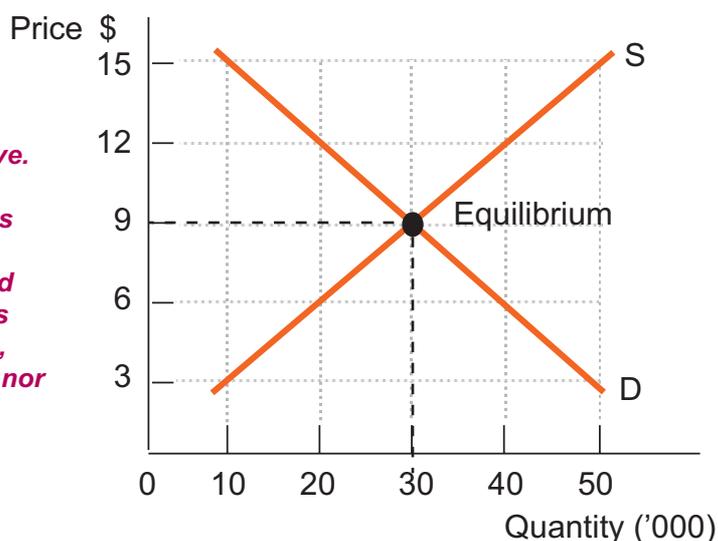
2.4 Equilibrium price and quantity

It is important to remember that a market consists of both buyers (demand) and sellers (supply). To determine the market price and quantity we combine the demand and the supply curve on the one graph. The price that clears the market is referred to as the **equilibrium price**. This is the price that balances the buying intentions of consumers with the selling intentions of producers. Figure 2.5 brings the two sides of the market (demand and supply) together. The equilibrium price and equilibrium quantity will be where quantity demanded equals quantity supplied. This will be the

Figure 2.5 Market equilibrium

Price \$	Quantity demanded	Quantity supplied	Result	Effect on price
15	10000	50000	surplus	decrease
12	20000	40000	surplus	decrease
9	30000	30000	equilibrium	no change
6	40000	20000	shortage	increase
3	50000	10000	shortage	increase

The equilibrium occurs where the demand curve intersects the supply curve. At the equilibrium price, quantity demanded equals quantity supplied. The equilibrium price is \$9 and the equilibrium quantity is 30,000. At the equilibrium, there is neither a surplus nor a shortage.

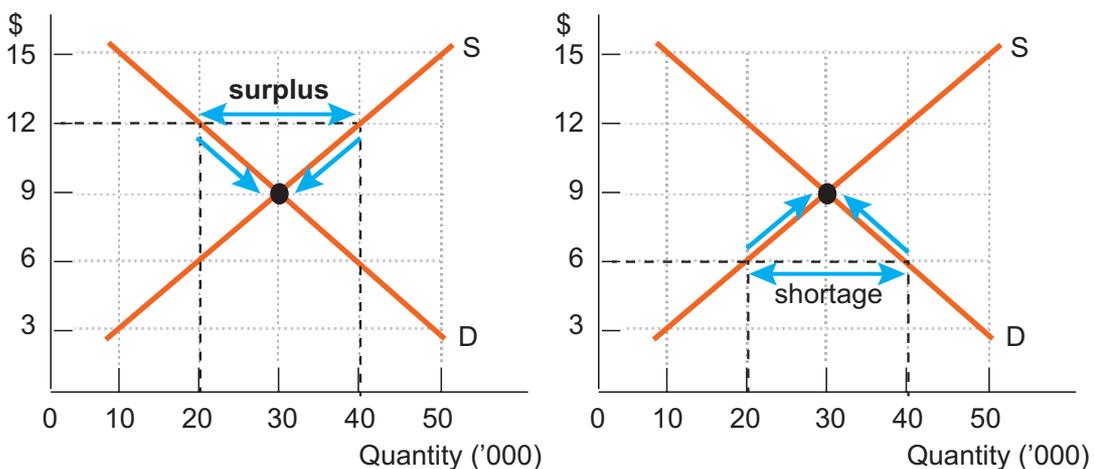


price where the demand curve intersects with the supply curve. At the equilibrium price, the amount that buyers are willing to buy is exactly equal to the amount that sellers are willing to sell. In our example of the pizza market, when the price for a pizza is \$9, buyers are willing to buy 30,000 and sellers are willing to sell 30,000. At any other price than \$9, there would be an imbalance between quantity demanded and quantity supplied.

What will happen if the market price is not at the equilibrium price? Will the market automatically adjust to the equilibrium price and quantity? Figure 2.6 shows the situation when the price is either above (panel A) or below (panel B) the equilibrium price. Suppose that the price of pizzas happened to be \$12. At this price, sellers are offering a quantity of 40,000 for sale, while buyers only wish to purchase 20,000. There is an excess supply or **surplus** of 20,000 pizzas. The price is too high to clear the market. Sellers will want to eliminate the surplus by lowering prices. As prices fall, more consumers will want to purchase so that the excess supply will be eliminated. Notice that as price falls, consumers move down along the demand curve, while sellers move down along the supply curve. As long as there is a surplus, sellers will have an incentive to lower prices - the price will keep falling until it reaches the equilibrium price of \$9.

Suppose that the price of pizzas happened to be \$6. At this price, sellers are offering a quantity of just 20,000 for sale, while buyers wish to purchase 40,000. Now there is an excess demand or **shortage** of 20,000 pizzas. The price is too low to clear the market. Buyers will react to the shortage by bidding up the price. As the price rises, more sellers will want to supply pizza and the excess demand will be eliminated. Notice that as the price rises, consumers move up along the demand curve, while sellers move up along the supply curve. As long as there is a shortage, sellers will have an incentive to increase prices - the price will keep rising until it reaches the equilibrium of \$9.

Figure 2.6 Surpluses and shortages



Only when the price of pizzas is \$9 will quantity demanded exactly match quantity supplied - 30,000 pizzas. At this price there is neither a surplus nor a shortage. The market is said to be in equilibrium. The word equilibrium means a state of balance or no tendency to change. Any price/quantity combination other than the equilibrium will automatically cause both the price and quantity to change in the direction of equilibrium. Excess supply forces prices down while excess demand causes prices to rise. These price adjustments are known in economics as the 'invisible hand' of the market - a term coined by Adam Smith. A more modern term is the price mechanism.

Prices are always adjusting in competitive markets in response to changes in demand and supply conditions. Changes to the market will create either temporary shortages or surpluses which will then cause price to change to re-establish a new equilibrium. The length of time required to eliminate shortages and surpluses though will vary from one market to another. In the share market, prices change very quickly to find a balance between buyers and sellers. The price of the Australian dollar in the foreign exchange market changes by the minute to balance supply and demand factors. In fruit and vegetable markets, prices adjust daily in response to supply and demand conditions. These are all good examples of competitive markets. As long as a market is able to operate freely, prices will always adjust to balance demand and supply.

Review Quiz

- 1. What does equilibrium mean?**
- 2. How does a shortage occur in a market? What will happen to price?**
- 3. How does a surplus occur in a market? What will happen to price?**
- 4. How would an improvement in technology affect the supply curve?**

2.5 Changes in demand and supply

Why do prices in markets fluctuate? The reason is that either demand conditions change which shifts the demand curve or supply conditions change which shifts the supply curve. Remember, a given demand curve and supply curve will establish a unique equilibrium price and quantity, but if the demand curve or the supply curve shift, then a new equilibrium will be established. It is important to understand what happens in the market given a change in either demand or supply. The explanatory box on page 34 highlights the four stage explanation process to understanding changes in markets. We can refer to four types of changes to a market equilibrium, because both the demand curve and the supply curve can increase (shift to the right) or decrease (shift to the left):

- an increase in demand
- a decrease in demand
- an increase in supply
- a decrease in supply

Understanding changes in equilibrium

We can get a better understanding of how changes in demand or supply affect market outcomes (price and quantity sold) using a 'four-stage' explanation method. This method can be used to analyse any given change to a market and predict what will happen to both equilibrium price and quantity.

Example 1: How does the market for apples react to a report that says "an apple a day keeps the doctor away"

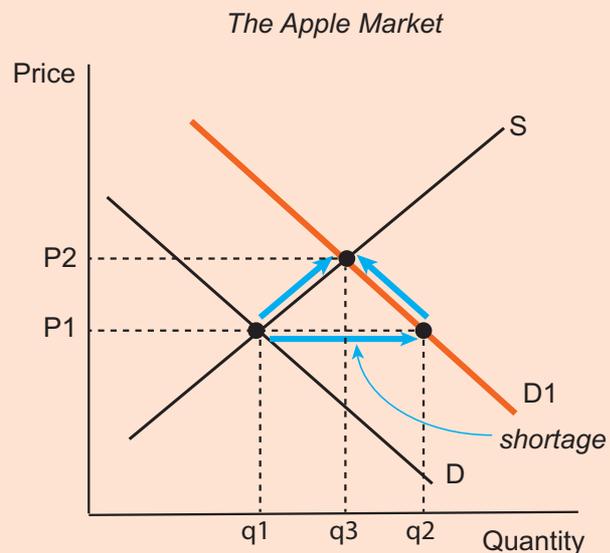
1.	Identify the cause of the change in demand or supply	Demand for apples increases (the D curve shifts to the right) because there is a favourable change in preferences
2.	Explain how the change causes a temporary shortage or surplus at the initial equilibrium	Increased demand creates a temporary shortage at the initial price
3.	Describe how market price reacts to the temporary shortage or surplus	Price always rises when there is a market shortage
4.	Describe how this causes a change in the quantity demanded or supplied	The increase in price causes an increase in Q_s and a decrease in Q_d as sellers and buyers react to the price rise

The apple market is in equilibrium at P_1 and q_1 . An increase in demand shifts the D curve to D_2 . At P_1 , Q_d increases to q_2 - but this creates a shortage = q_1q_2 . As price is bid up to P_2 , Q_s rises and Q_d falls to the new equilibrium of q_3 .

If there was a decrease in demand in a market, then there would initially be a temporary surplus - this would cause the price to start falling to clear the surplus.

Use the 4 stage explanation to analyse the following:

1. The market for bananas is adversely affected by a cyclone.
2. A news report warns of the negative health effects of consuming coffee.



For each of these changes, we want to analyse the impact on both equilibrium price and quantity.

- **Increase in demand**

Imagine a new medical report that announced that pizza consumption improved your intelligence. This would lead to an increase in the demand for pizzas - the demand curve for pizzas will shift to the right, as consumers' preferences change (see Figure 2.7, panel A). At the original equilibrium price of \$9, quantity demanded will now increase to 40,000 which is 10,000 more than quantity supplied - in other words, there is now a shortage in the market. This excess demand for pizzas will cause the price to rise to a higher equilibrium where the new demand curve intersects with the supply curve. At the higher price of \$10.50, quantity supplied will increase to 35,000 while quantity demanded will fall from 40,000 to the new equilibrium of 35,000. So an increase in demand will result in an increase in both the equilibrium price and equilibrium quantity. Whenever you see rising prices and rising sales in a market, then you know that demand for the good is increasing.

- **Decrease in demand**

Imagine if it was reported that pizza consumption was a cause of cancer. Now consumers would change their preferences away from pizza. This would lead to a decrease in the demand for pizza - the demand curve for pizzas will shift to the left (see Figure 2.7, panel B). At the original equilibrium price of \$9, quantity demanded would fall to 20,000 which is now 10,000 less than quantity supplied at the original equilibrium - there is now a surplus in the market. This excess supply of pizzas will cause the price to fall to a lower equilibrium price of \$7.50. At the lower price, quantity supplied will fall to the new equilibrium quantity of 25,000. Whenever you see prices and quantities falling in a market, then you can safely assume that demand for the product is decreasing.

- **Increase in supply**

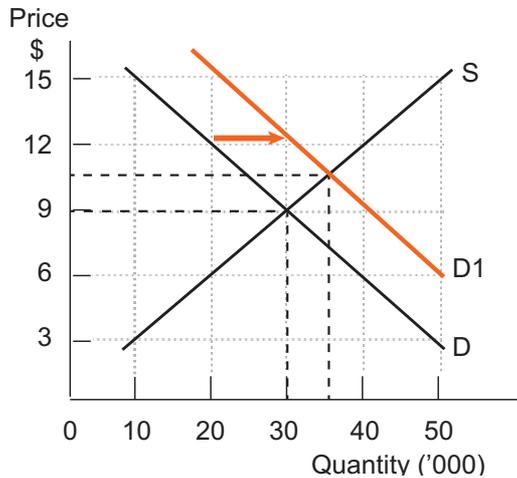
A change in production costs or technology are important factors that can shift the supply curve. Suppose that a new pizza oven is created which reduces the time to cook pizza helping to lower production cost. This will cause the supply curve to shift to the right - an increase in supply (see panel C). Pizza producers will now be able to supply more pizzas for the same cost. At the initial price of \$9, producers now want to sell 40,000 - a surplus of 10,000. The excess supply will drive price down to the new equilibrium of \$7.50 and new quantity of 35,000.

- **Decrease in supply**

Suppose there was an increase in the price of mozzarella cheese - a key ingredient in producing pizzas. This would increase the cost of making pizza and would cause the supply curve to shift to the left - a decrease in supply (see panel D). Pizza producers will now be willing to supply less pizzas. At the initial price of \$9, producers now want to sell 20,000 but buyers want 30,000. The excess demand will drive price up to the new equilibrium of \$10.50 and new quantity of 25,000. The new equilibrium will be where the new supply curve intersects with the original demand curve.

Figure 2.7 Changes in equilibrium

A. Increase in Demand



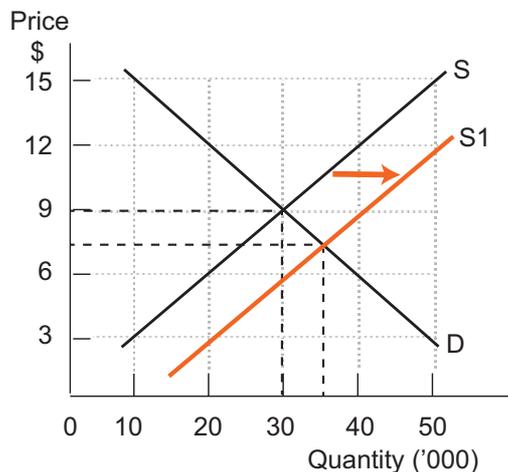
A. An increase in demand causes both equilibrium price and quantity sold to rise. Price has increased to \$10.50 and quantity has risen to 35,000 pizzas.

B. Decrease in Demand



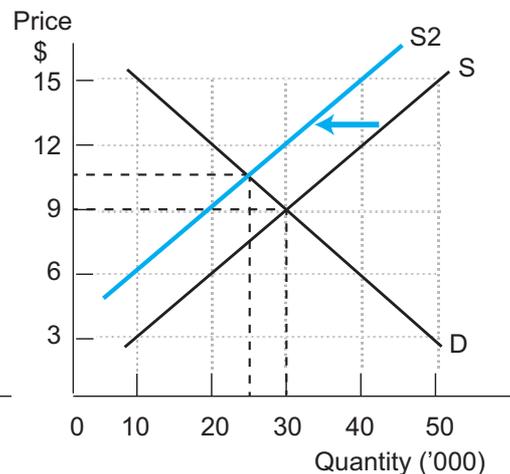
B. A decrease in demand causes both equilibrium price and quantity sold to fall. Price has decreased to \$7.50 and quantity has fallen to 25,000 pizzas.

C. Increase in Supply



C. An increase in supply will cause a decrease in equilibrium price and an increase in equilibrium quantity - in this example, price falls to \$7.50, while quantity rises to 35,000.

D. Decrease in Supply



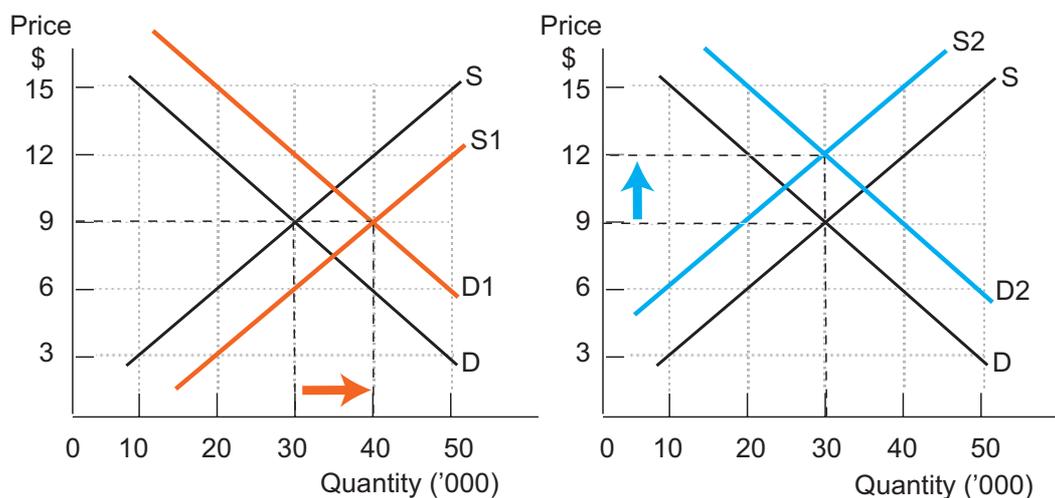
D. A decrease in supply will result in an increase in equilibrium price and a decrease in equilibrium quantity - in this example, price rises to \$10.50, while quantity falls to 25,000.

Simultaneous shifts in demand and supply

When a single curve shifts, our model of demand and supply makes it relatively easy to predict the movement in price and quantity. However, what will happen to equilibrium price and quantity if both curves shift at the same time? While this is more complex, our model can still be used to analyse the changes to price and quantity. For example, if we combine an increase in demand with an increase in supply (Figure 2.8, panel A), then the equilibrium quantity must increase, but the equilibrium price may rise, fall or stay constant - it is indeterminate. This is because an increase in demand pushes price up while an increase in supply pulls price down. What happens to price will depend on the relative shift of each curve. If the demand curve shifts more than the supply curve, then the equilibrium price will rise. If the supply curve shifts by more, then the equilibrium price will fall. In our example, both curves have shifted the same amount so that the equilibrium price has not changed.

Let's examine another case of a simultaneous shift. Panel B in Figure 2.8 shows the impact of an increase in demand combined with a decrease in supply. In this case equilibrium price must increase, but equilibrium quantity is now indeterminate. This is because an increase in demand increases quantity while a decrease in supply decreases quantity. Quantity may increase, decrease or remain constant - it will depend on the relative shifts of the curves. If the demand curve shifts more than the supply curve, then the equilibrium quantity will rise. If the supply curve shifts by more, then the equilibrium quantity will fall.

Figure 2.8 Simultaneous changes



A. An increase in demand and supply will cause quantity sold to rise but the effect on price is indeterminate - in this example, Q has increased to 40,000 while P has remained at \$9.

B. An increase in demand and a decrease in supply will result in price rising but the effect on quantity is indeterminate - in this example, P has increased to \$12 while Q has remained at 30,000.

Figure 2.9 Predicting market changes

Type of Shift	Effect on Price	Effect on Quantity
<i>Increase in demand and no change in supply</i>	<i>Increase</i>	<i>Increase</i>
<i>Decrease in demand and no change in supply</i>	<i>Decrease</i>	<i>Decrease</i>
<i>Increase in supply and no change in demand</i>	<i>Decrease</i>	<i>Increase</i>
<i>Decrease in supply and no change in demand</i>	<i>Increase</i>	<i>Decrease</i>
<i>Increase in demand and Increase in supply</i>	<i>Indeterminate</i>	<i>Increase</i>
<i>Increase in demand and Decrease in supply</i>	<i>Increase</i>	<i>Indeterminate</i>
<i>Decrease in Demand and Increase in Supply</i>	<i>Decrease</i>	<i>Indeterminate</i>
<i>Decrease in Demand and Decrease in Supply</i>	<i>Indeterminate</i>	<i>Decrease</i>

In our example, both curves have shifted the same amount so that the equilibrium quantity has not changed. Figure 2.9 summarises the effects on price and quantity of shifts in both demand and supply. Notice that when both curves shift, it is possible to only predict what will happen to either price or quantity but not both. Only if we have more information about the size of the relative shifts of each curve can we predict the outcome on both price and quantity. For example, if there was an increase in demand for pizza which was greater than a decrease in supply, then both price and quantity would increase.

Review Quiz

- 1. What effect does an increase in demand have on market price and quantity?**
- 2. What effect does an increase in supply have on market price and quantity?**
- 3. If the demand for mobile phones increases but at the same time improvements in technology reduce production costs, what will happen to the equilibrium price and quantity? Use a model to explain.**
- 4. What will be the effect of panic buying and supply disruptions on market price and quantity? Use a model to explain.**

2.6 Case Studies

The banana and apple market

The Australian fruit and vegetable market is often affected by the cyclone season in Queensland - destructive winds and rain can destroy much of Queensland's crops resulting in shortages and high prices. The last cyclone to devastate Queensland destroyed a large part of the state's banana crop. Queensland accounts for over 90 per cent of Australia's banana production. What would we predict would happen to banana prices and sales? Using our model of demand and supply we would show the effect of the cyclone as a large decrease in supply. This would result in a spike in banana prices and a significant fall in banana sales (Figure 2.10).

Is there a shift in the demand curve? The answer is no! If a news report told you that a cyclone was approaching, would eating bananas protect you from a cyclone? The answer is no - the demand curve for bananas does not shift! Do not make the mistake of thinking that if banana prices increase this will cause a decrease in the demand for bananas (shift the D curve to the left). It is important to remember that a change in price cannot shift the curve. What did banana consumers do in response to banana prices tripling? They obviously stopped buying bananas - as the price of bananas rose, quantity demanded fell and looked for a substitute fruit. Is there a close substitute for bananas? Yes, Australian consumers actually increased their purchases of apples! Apples certainly don't look or taste like bananas - they are generally red, round and crisp rather than yellow, long and squishy. But Australian consumers did switch to apples as their replacement fruit. In the apple market, there was a large increase in the demand for apples resulting in apple prices and sales both increasing. This is exactly what our model would predict.

Figure 2.10 Related markets



A cyclone destroys banana plantations in Queensland. This causes a large decrease in supply.

The rise in the price of bananas causes the demand for apples (a substitute good) to increase.

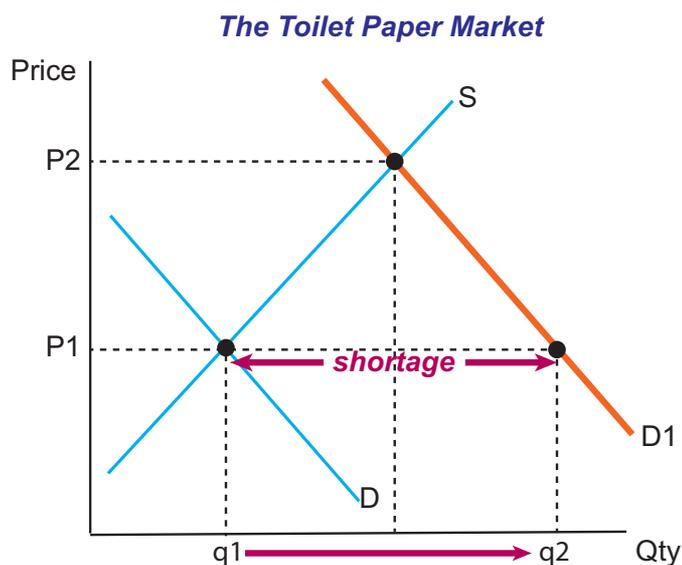
Covid and the disappearing toilet paper

The Coronavirus pandemic caused unprecedented disruption to everyone's life. The virus was global – spreading quickly to every country. One unusual feature associated with the pandemic was the panic buying and hoarding of toilet paper. In Australia, a cafe began accepting rolls of toilet paper as payment — a cup of coffee exchanged for three rolls. In Hong Kong, armed criminals held up a supermarket - all they took was 100 rolls of toilet rolls. Can our model of demand and supply help explain this bizarre behaviour? One theory that behavioural economists point to is 'herd behaviour'. This occurs when people make a decision based on the behaviour of others. If people suddenly see others rushing to buy toilet paper, then they will follow suit, even if it doesn't make any sense. Consumers as a group, often have a strong sense to conform and copy the behaviour or choices of others. An individual may feel that the group (the herd) must be acting on information that they don't possess. Media reports frequently showed images of shoppers hauling multiple shopping carts filled to the brim with toilet paper. The very sight of these images created a sense of urgency for others to follow suit.

What was happening in the market for toilet paper? The panic buying led to a very large increase in demand for toilet paper - shelves were wiped clean! In a normal competitive market, price would quickly rise to eliminate the shortage. But supermarkets kept prices at the initial level for fear of being accused of 'price gouging'. If price stays at the original price there is now a massive shortage. If market price were allowed to rise to reflect the scarcity of toilet paper, then the shortage would disappear - higher prices would prevent many consumers from hoarding the toilet paper.

Figure 2.10 Toilet paper shortage

The Covid pandemic led to panic buying and hoarding of toilet paper. There was a massive increase in the demand for toilet paper - shifting the demand curve from D to D1. Quantity demanded increased from q_1 to q_2 . If price were allowed to rise to P_2 , there would be no shortage - the higher price would ration the available supply. But keeping prices at P_1 meant that toilet paper quickly disappeared from supermarket shelves.



3 Elasticity



Learning Objectives

In this chapter you will learn about:

- *the concept, and measurement, of price elasticity of demand*
- *the determinants of price elasticity of demand*
- *the link between price elasticity of demand and total revenue*
- *the concept, and measurement, of income elasticity of demand*
- *the concept of cross elasticity of demand*
- *the concept of price elasticity of supply*
- *the determinants of price elasticity of supply*
- *the significance of price and income elasticity for consumers, business and government*

The laws of demand and supply help to explain how consumers and producers interact in markets. Changes in demand and supply also help to explain the movement of prices. We can gain further understanding about demand and supply by knowing how responsive consumers and producers are to a given change in price. For example, if the price of pizza were to increase by 10 per cent, would consumers decrease their quantity demanded by more than 10 per cent, less than 10 percent, or exactly 10 per cent? In other words, it is useful to know whether the law of demand (and the law of supply) is likely to be relatively strong or weak for different types of goods. This chapter takes us behind the demand curve and the supply curve to provide more detailed information about how much quantity demanded or quantity supplied responds to a given change in price. Economists use a concept called **elasticity** to provide this information. Price elasticity is a measure of the responsiveness or sensitivity of quantity to a change in price.

3.1 Price elasticity of demand

Price elasticity of demand is defined as the responsiveness of quantity demanded to a change in the price of the good or service. To help illustrate price elasticity of demand, suppose that the present price of a coffee (e.g. cappuccino) is \$4, and one million coffees are sold in Perth every week. What will happen to the quantity sold if the price rises by 10 per cent or \$0.40? We know from the law of demand that when price rises, quantity demanded falls. But by how much will sales fall?

As a Year 11 economist, would you predict that coffee consumption would fall by a large amount or a small amount after the 10 per cent price rise? Suppose that market research indicated that the \$0.40 price rise would lead to a fall in quantity demanded equal to 30,000 coffees per week. We need to know how large the fall in quantity was relative to the price increase. To do this we compare the percentage change in price with the percentage change in quantity. The quantity change is 30,000 which represents a 3 per cent (30,000 / 1 million) change. So, a ten per cent price rise caused quantity demanded to fall by just 3 per cent! From this evidence we could conclude that the demand for coffee is not very responsive to changes in price. We would say that the demand for coffee is **inelastic** or not responsive.

We can calculate price elasticity of demand (E_d) using a number of methods. If we use the percentage change method, the formula is:

$$E_d = \frac{\text{percentage change in quantity}}{\text{percentage change in price}}$$

In our example, $E_d = 3\%/10\% = 0.3$.

As long as the percentage change in quantity is less than the percentage change in price, the answer will be less than one and this indicates that demand is inelastic. In this example, it was relatively easy to calculate the percentage change, but in other examples, the data may be more complex. In such cases, it is easier to use an alternate formula:

$$E_d = \frac{\Delta Q}{Q} / \frac{\Delta P}{P}$$

where Q = quantity demanded; P = price and the delta symbol Δ refers to 'change.'

The equation can be transformed to

$$E_d = \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

Substituting the figures from the coffee example above,

$$\begin{aligned} E_d &= \frac{30,000}{1,000,000} \times \frac{4}{0.4} \\ &= 0.3 \end{aligned}$$

The answer is known as the **elasticity coefficient**. In this instance it means that a 1 per cent change in the price of coffee will lead to a 0.3 per cent change in quantity demanded. When the value is less than 1, it means that the law of demand is relatively weak - quantity demanded is not very responsive to a price change. Why not? It is usually determined by the substitution effect. Coffee is addictive and has few close substitutes. If the price of coffee rises then consumers cannot easily substitute away from the product. Demand will be relatively inelastic. Other goods with inelastic demand would be alcohol (beer wine, spirits), petrol and basic food products such as bread and milk. Notice that goods that are necessities will have few close substitutes and will therefore be inelastic. This means that quantity demanded responds weakly to a change in price.

The price elasticity coefficients are sometimes shown with a minus sign in front of them because quantity and price are negatively related (the demand curve has a negative slope). By convention, however, we ignore the minus sign because we are only interested in the absolute number.

What about products that have relatively close substitutes. We would expect that quantity demanded would be more sensitive to a change in price. Suppose that the price of pizza were to rise relative to other fast food goods. Assume that the price of pizza were to increase from \$10 to \$11 and weekly pizza consumption decreased from 500,000 to 400,000. What would be the price elasticity of demand for pizza? Applying our formula:

$$\begin{aligned} E_d &= \frac{\Delta Q}{Q} \times \frac{P}{\Delta P} \\ E_d &= \frac{100,000}{500,000} \times \frac{10}{1} \\ &= 2.0 \end{aligned}$$

What does the answer mean? It means that a 1 per cent change in the price of pizza results in a 2 per cent change in the quantity demanded; or a 10 per cent change in price leads to a 20 per cent change in quantity demanded. When the value of E_d is greater than 1, it means that the law of demand is relatively strong - quantity demanded is relatively responsive to a price change. In this case demand is said to be relatively **elastic**. The larger the elasticity coefficient, the more responsive demand is to price which indicates that there is likely to be many close substitutes.

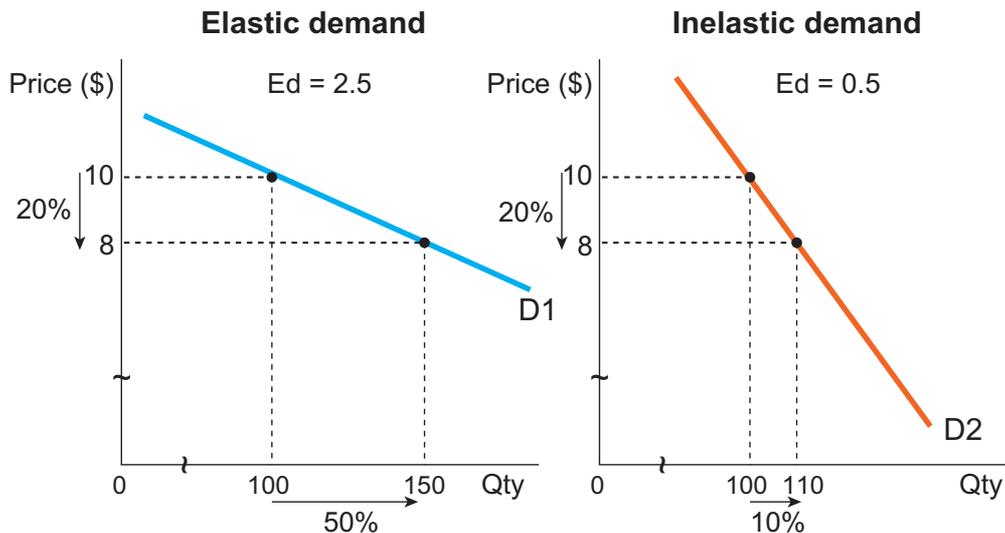
Figure 3.1 compares a relatively elastic demand curve (D1) with an inelastic demand curve (D2). On both demand curves, price has fallen by 20 per cent - from \$10 to \$8. On demand curve D1, quantity increases from 100 to 150 - an increase of 50 per cent. But on demand curve D2, quantity increases from 100 to 110 - an increase of just 10 per cent. So D1 reflects an elastic demand with $E_d = 2.5$, while D2 reflects an inelastic demand with $E_d = 0.5$.

The formula we have been using is called the **point method** because we are calculating elasticity from a specific point or price on the demand curve. In the case of the pizza example, we calculated elasticity for a price increase from \$10 to \$11. But what if we calculated the elasticity for a price decrease from \$11 to \$10 (quantity rising from 400,000 to 500,000)? Would we get the same answer? The answer is no! The answer changes because the value for P and Q in our formula will change:

$$E_d = \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

$$\begin{aligned} E_d &= \frac{100,000}{400,000} \times \frac{11}{1} \\ &= 2.75 \end{aligned}$$

Figure 3.1 Elastic and inelastic demand



Using the simple point method gives two different answers depending on whether we are increasing or decreasing price. To avoid this confusion we use an averaging technique, called the **midpoint method**. In our formula we use the average or midpoint price and the average or midpoint quantity. This would mean that in our pizza example, the value for price would be \$10.50 (P_{ave}) and the value for quantity would be 450,000 (Q_{ave}). The two change variables (ΔP and ΔQ) stay the same.

Using the new midpoint formula:

$$E_d = \frac{\Delta Q}{Q_{ave}} \times \frac{P_{ave}}{\Delta P}$$

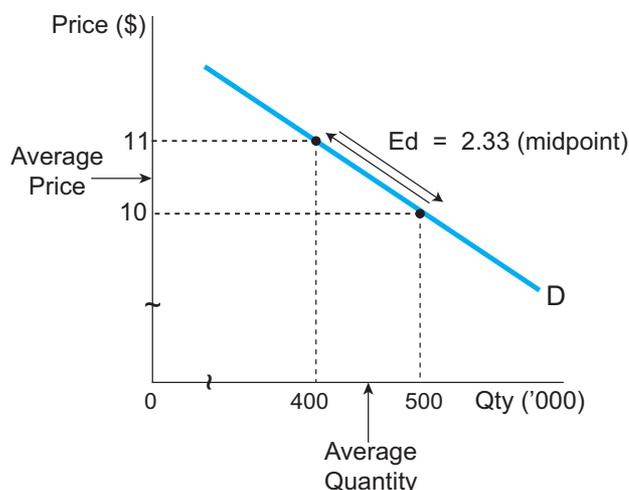
$$E_d = \frac{100,000}{450,000} \times \frac{10.5}{1}$$

$$= 2.33$$

The advantage of using the midpoint formula is that the answer does not depend on which price we choose as the starting price - instead we are calculating the elasticity along the same segment of the demand curve. The midpoint method for calculating price elasticity is shown below in figure 3.2. This is usually the preferred method used by economists.

Along any normal downward sloping demand curve, price elasticity decreases as we move down the demand curve. In other words price elasticity falls as price falls. This makes sense if you remember the formula: $E_d = \Delta Q / \Delta P \times P/Q$. As price falls, quantity rises so that the P/Q value will decrease. Generally consumers are not that price sensitive to relatively inexpensive goods and are more price sensitive to expensive luxury goods. For example, if a good that costs \$1 increases by 10 per cent to \$1.10 it will not have much impact on the spending decisions of buyers.

Figure 3.2 The midpoint method



Price elasticity of demand measures the responsive of quantity demanded to a change in price. To measure the elasticity between \$10 and \$11 we use the midpoint formula - this means using the average price and the average quantity in the elasticity formula.

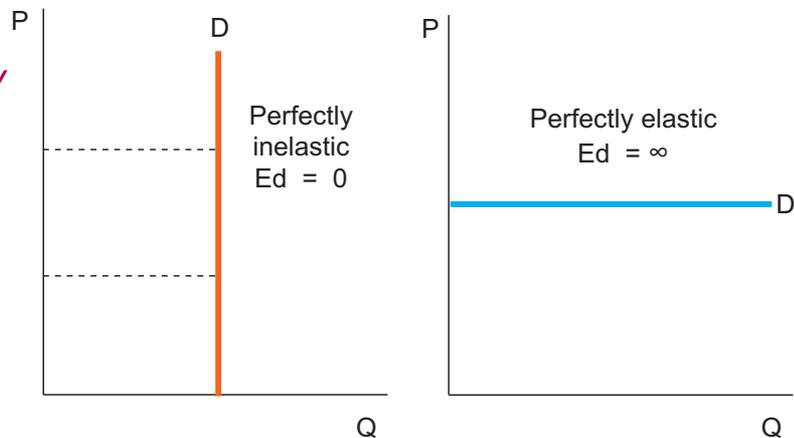
But if a good that costs \$5,000 increases in price by 10 per cent to \$5,500 it is likely to impact on buyers significantly.

In theory, the value of price elasticity of demand can range between zero and infinity. If price elasticity equals zero, then a change in price will have no effect on quantity demanded - demand is said to be **perfectly inelastic** ($E_d = 0$). The demand for heroin by a drug addict or insulin for a diabetic would be examples of perfectly inelastic demand. If price increases, there is no change in quantity demanded - the law of demand in this case stops working. A perfectly inelastic demand curve is vertical. A horizontal demand curve is said to be **perfectly elastic** and price elasticity would equal infinity ($E_d = \infty$). An example of this would be a good with a perfect substitute - if the price of one good increases by one cent, consumers would stop buying the good and switch to the substitute. Figure 3.3 summarises the different types (values for price elasticity of demand). The slope of the demand curve is often used to convey whether demand is likely to be elastic or inelastic. Generally, the steeper the demand curve, the lower the elasticity (more inelastic) and the flatter the demand curve, the higher the elasticity (more elastic).

Figure 3.3 Price elasticity of demand

Type	Effect of a 1% increase in price	Examples
Perfectly inelastic $E_d = 0$	Quantity demanded does not change - the D curve is vertical	Goods with no substitutes
Inelastic $E_d < 1$	Quantity demanded decreases by less than 1% - relatively steep D curve	Goods with few close substitutes
Unitary elastic $E_d = 1$	Quantity demanded decreases by exactly 1% - equally proportional D curve	Goods with some close substitutes
Elastic $E_d > 1$	Quantity demanded decreases by more than 1% - relatively flat D curve	Goods with many close substitutes
Perfectly elastic $E_d = \infty$	Quantity demanded decreases to zero - horizontal D curve	Goods with perfect substitutes

When demand is perfectly inelastic, a change in price has no effect on Q_d - the demand curve is vertical. When demand is perfectly elastic, a change in price causes an infinitely large change in Q_d - the D curve is horizontal.



Review Quiz

1. Define price elasticity of demand.
2. How is price elasticity of demand calculated?
3. If price elasticity equals 2.5, this means that a 10% increase in price will cause quantity demanded to decrease by _____ %.
4. If price elasticity equals zero, then this would mean that when price changes quantity demand would change by _____ %.
5. What is the difference between a relatively price elastic demand curve and a price inelastic demand curve?

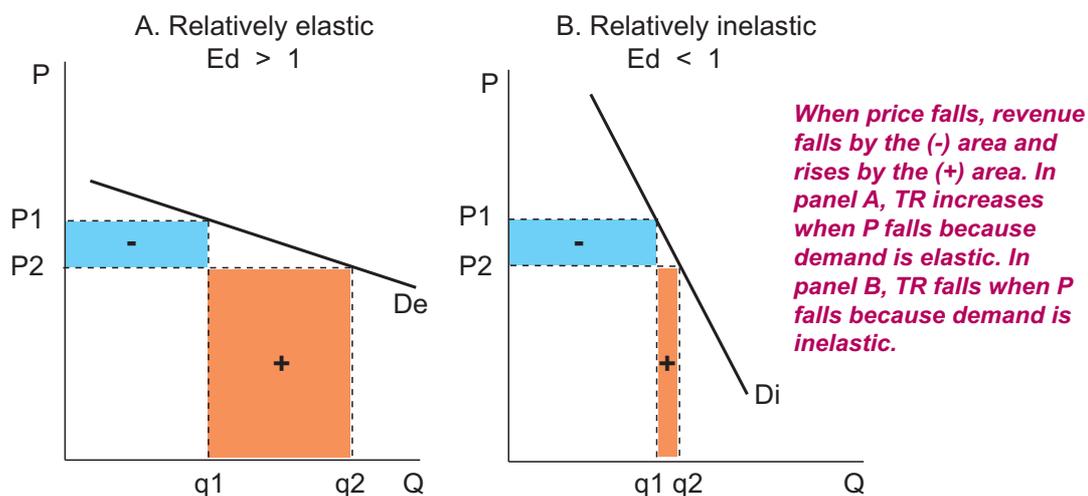
Price elasticity and total revenue/total expenditure

Price elasticity of demand is an important concept because of its link with the concepts of **total revenue** of business firms and **total expenditure** of households. Total revenue or total expenditure is simply price multiplied by quantity:

$$TR (TE) = P \times Q$$

Total revenue or expenditure can be measured using the demand curve. Figure 3.4 shows two demand curves - one that is relatively elastic (flat) and one that is relatively inelastic (steep). Total revenue (expenditure) is shown by the rectangle formed by price and quantity underneath the demand curve. If price falls from P1 to P2 then quantity demanded will increase from Q1 to Q2. But notice that the effect on total revenue is different. In panel (a) where demand is relatively elastic, total revenue has increased because the change in Qd is much greater than the change in price. In panel (b) where demand is relatively inelastic, total revenue has decreased because the change in Qd is much smaller than the change in price.

Figure 3.4 Price elasticity and total revenue



What would happen if we increased price? If demand is elastic, total revenue will fall, because the percentage decrease in Qd will be greater than the percentage increase in price. If demand is inelastic, then total revenue will increase - the fall in Qd will be smaller than the rise in price. So the important conclusion is that if we know the price elasticity of a good, then we can accurately predict what will happen to a firm's total revenue when it changes the price of its product. Why do firms have discount sales? Presumably to increase their revenue which means they think that the demand for their product must be elastic. What happens to total revenue (expenditure) if demand is unitary elastic and price changes? The answer is nothing, total revenue would not change. This is because if price increased by 10 percent, quantity demanded would decrease by exactly 10 per cent ($E_d = 1$).

Let's summarise the relationship between price elasticity of demand and total revenue:

- *When D is elastic, Price and TR revenue move in opposite directions e.g. a rise in P decreases TR, while a fall in P increases TR*
- *When D is inelastic, Price and TR revenue move in the same direction e.g. a rise in P increases TR, while a fall in P decreases TR*
- *When D is unitary elastic, a change in P does not change TR*

The concept of elasticity plays an important role in a firm's pricing policy. Why do some firms (e.g. cinemas) charge children and students a lower price than adults? Why do hairdressers charge males a lower price than females for a haircut? The answer is that different consumer groups have a different price elasticity of demand and firms can use this information to charge different prices and increase their total revenue. This common pricing practice is known as **price discrimination** and

Firms can use elasticity to price discriminate between customers - higher prices for customers with inelastic demand and lower prices for customers with elastic demand.

is used by many firms throughout the economy. Firms can boost their revenue by segmenting their customers into separate groups according to their elasticity. Why do females pay more for hairstyling services? Because their demand for these services is very inelastic. By charging females a higher price than males, hair salons can increase their revenue. At the same time, the hair salons can also boost their revenue by charging males a much lower price

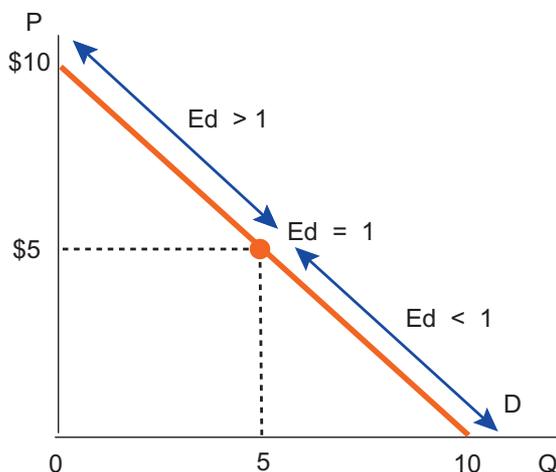
because their demand is relatively elastic. Many firms charge a higher price for adults and a lower price for students and seniors. Is this price discrimination? The answer is yes! Students and seniors will have a more elastic demand because they have a lower income. Adults will have a more inelastic demand, so firms can increase their revenue by charging a lower price to students and a higher price to adults. Can you think of other examples of price discrimination?

Figure 3.5 depicts a linear demand curve and shows the relationship between price elasticity and total revenue as we move along the demand curve. At the top of the demand curve where the demand curve intersects the price axis, price elasticity equals infinity. At the bottom of the demand curve where the curve intersects the quantity axis, price elasticity equals zero. At the midpoint of the demand curve,

Figure 3.5 Elasticity along a linear demand curve

As you move down along a linear demand curve, price elasticity falls. At the top of the D curve where quantity is zero, elasticity is infinite and at the bottom of the D curve where price is zero, elasticity is zero. At the midpoint of the D curve, elasticity is equal to one. This means that the top half of the demand curve is elastic, while the bottom half is inelastic.

\$ Price	Quantity demanded	\$TR	Ed
10	0	0	∞
9	10	90	9.00
8	20	160	4.00
7	30	210	2.33
6	40	240	1.50
5	50	250	1.00
4	60	240	0.67
3	70	210	0.43
2	80	160	0.25
1	90	90	0.11
0	100	0	0



price elasticity exactly equals one. Notice that we can now divide the demand curve into the elastic segment (the top half of the D curve) and the inelastic segment (the bottom half of the D curve). If a firm is located on the top half of the demand curve it can increase its revenue by lowering price, while if it was located on the bottom half it could raise total revenue by raising price. Where is total revenue maximised on the demand curve? The answer is at the midpoint - where demand is unitary elastic. Demand is price elastic between \$10 and \$5 - as price falls, total revenue increases from \$0 to \$250. Between \$5 and \$0, demand is inelastic - as price falls, total revenue decreases from \$250 to \$0. At the midpoint (\$5), demand is unitary elastic and total revenue is maximised at \$250.

Covid and price elasticity

During the Covid period of 2020-21, many firms faced increasing costs due to supply bottlenecks and shortages of resources, including raw materials and skilled labour. Firms had to choose whether to absorb the higher costs and reduce their profit margins or raise prices and risk losing sales. Many firms that did raise prices found to their surprise that sales did not fall by that much - this translates into a low elasticity of demand (price inelastic). It appears that in times of stress and uncertainty, consumers become less sensitive to price increases and stay loyal to their regular brands. Shoppers who are less likely to want to spend time in a crowded shopping centre will be less inclined to shop around for a cheaper generic brand.

The determinants of price elasticity of demand

The key factors determining whether a good is price elastic or inelastic are:

- ***The availability of substitutes***

The greater the number of close substitutes a good has, the more price elastic its demand. If the price of good X rises and it has many close substitutes, then consumers will be sensitive to the price change because they can easily switch to other products. The demand for goods that have few substitutes such as food or water would be very inelastic. Consider the example of petrol. The demand for petrol would be highly inelastic because it has few substitutes. Once you have bought a car with a petrol engine, then you must purchase petrol to use the car - you can't fill up your tank with tap water!

- ***Whether the good is a necessity or a luxury***

We would expect to find that necessity type goods such as basic items of food will be more price inelastic than luxury type goods such as jewelry, designer hand bags, and French champagne. Goods such as bread, milk and rice will be relatively inelastic in demand because these are essential food groups. Petrol and water would also be considered as necessities and would be relatively insensitive to price. Habit forming and addictive goods such as tobacco and alcohol are highly price inelastic because they are perceived as necessities by people who use them.

- ***Definition of the market***

The demand for a good in a broadly defined market will be more inelastic than the demand for a good in a narrowly defined market. For example, petrol is a broadly defined market whereas a particular brand of petrol is a narrowly defined market. The demand for a specific brand such as BP, Coles Express or Caltex, would be very elastic because each brand acts as a very close substitute. If a BP service station raised its price from \$1.40 to \$1.50 per litre, it would lose customers to a Coles service station nearby which left its price at \$1.40. We can generalise by saying that, for all goods, the price elasticity of a single brand is greater than the price elasticity of the good in general.

- ***The proportion of income spent***

Expensive goods are likely to be relatively price elastic because they take up a larger proportion of a consumer's income or budget. Cheaper, inexpensive items on the other hand, will be relatively price inelastic. For example, if the price of a coffee were to increase from \$4 to \$5 - a 25 per cent increase, it is unlikely to cause a significant decrease in the quantity demanded of coffee. However, if the price of a large screen television were to increase by 25 per cent (from \$3000 to \$3750) we would expect this price increase to have a greater proportional effect on quantity demanded.

- ***Time***

If consumers have time to respond to a price change, then demand will be more price elastic. In the very short run, demand for most commodities will be relatively

inelastic because consumers do not have the time to adjust their consumption or find substitute products. As the time period increases though, it becomes easier to change consumption patterns and so demand becomes more elastic. When petrol prices jump to very high levels, most consumers cannot change their consumption in the short run - they still have to fill their tank in order to drive to work. But if the price of petrol remains high over a longer period, then people will be able to respond and adjust their consumption by using public transport or switching to electric or hybrid cars.

Review Quiz

1. How does a firm calculate its total revenue?
3. Explain why total revenue increases when price decreases if demand is price elastic.
4. Would a firm prefer its product to be price elastic or price inelastic? Explain your answer.
5. Why is the availability of substitutes important in determining whether a good is likely to be price elastic or inelastic?

3.2 Price elasticity of supply

Price elasticity of supply measures the responsiveness of quantity supplied to a change in price. To calculate the formula for the price elasticity of supply, we use the same formula as for price elasticity of demand, except that we use quantity supplied instead of quantity demanded:

$$E_s = \frac{\% \text{ change in } Q_s}{\% \text{ change in price}}$$

Price elasticity of supply provides information about how quickly producers can respond to a change in price. It is measured as the percentage change in quantity supplied, divided by the percentage change in price. Similar to the formula for price elasticity of demand, price elasticity of supply can be written as:

$$E_s = \frac{\Delta Q_s}{Q_s} / \frac{\Delta P}{P}$$

We normally transform this to:

$$E_s = \frac{\Delta Q_s}{Q_s} \times \frac{P}{\Delta P}$$

If the percentage change in quantity supplied is greater than the percentage change in price, then supply is price elastic and the coefficient would be greater than one. For example, if the demand for pizzas increased causing the price to rise by 10 per

cent and producers responded by increasing quantity supplied by 20 per cent, then the supply of pizzas would be price elastic and E_s would equal 2. If on the other hand, producers could only increase quantity by 8 per cent, then supply would be price inelastic and E_s would equal 0.8.

The coefficient of price elasticity of supply can also range between zero and infinity. If E_s equals zero, price changes will have no effect on supply. Supply in this instance is said to be perfectly inelastic and the supply curve will be a vertical line. The supply of Rembrandt paintings, for example, is perfectly inelastic - there is a fixed quantity of originals which cannot be increased. The number of seats at the Optus Stadium in Perth is fixed at 60,000 seats, so the supply of seats is perfectly inelastic. A horizontal supply curve is said to be perfectly elastic and the coefficient E_s would equal infinity. When comparing two supply curves, the steeper supply curve will always be relatively more inelastic. Figure 3.6 illustrates two supply curves intersecting at the same price and quantity (P_1 and Q_1). When price rises from P_1 to P_2 , quantity supplied rises for both supply curves, but by different amounts. The quantity change for supply curve S_i is much smaller than the quantity change for supply curve S_e . Supply curve S_i is said to be more inelastic compared with S_e (or supply curve S_e is said to be relatively more elastic compared with S_i .)

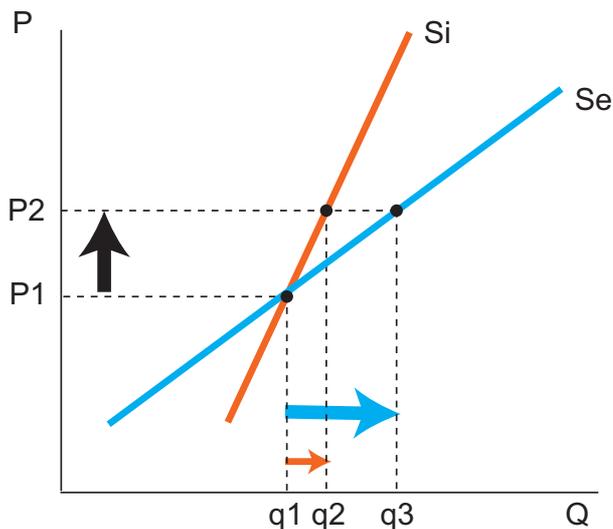
The determinants of price elasticity of supply

The key factors determining the responsiveness of producers are:

- **Time**

If the producer can respond quickly to a price change then supply will be price elastic. In the very short run, it may be difficult for a producer to suddenly increase output,

Figure 3.6 Price elasticity of supply



The supply curve S_e is relatively elastic, compared to supply curve S_i . Producers are more responsive to a price increase when supply is price elastic. Along S_i , quantity supplied increases from q_1 to q_2 when price increases from P_1 to P_2 . But along S_e , quantity supplied increases by more from q_1 to q_3 .

especially if inventories are low. Supply will therefore tend to be price inelastic. As time increases, producers will be able to obtain more inputs and expand output more easily. As time increases, the supply of most goods becomes more elastic. Consider the supply of oil. At a particular point in time, the supply of oil is relatively fixed - there is a known quantity of oil reserves, so in the short term the supply of oil is relatively inelastic. However over time, exploration and discovery can increase the quantity of oil, so that in the long term the supply of oil is relatively more elastic.

- **Nature of the industry**

The supply of agricultural products tends to be relatively price inelastic, while the supply of manufactured goods is more price elastic. Products such as wheat, wool and meat require a reasonable amount of time to produce (up to 12 months). If the price of wheat suddenly increases, farmers cannot quickly respond, they must wait for the next growing season. Manufactured goods on the other hand are relatively easy to produce. Firms can quickly expand the output of computers, iPads, mobile phones and DVDs in response to an increase in price.

- **Ability to store inventories**

Inventories refer to stocks that a producer keeps stored for future sale. If a producer has the ability to store or warehouse its goods, then it can respond fairly quickly to an a change in demand and so supply would be relatively elastic. Supermarkets are able to store non-perishable goods in large warehouses and ship them whenever a store runs out of product. Goods that are perishable, such as fresh fruit and vegetables, cannot be stored readily and so their supply would be relatively inelastic.

Review Quiz

1. **Define price elasticity of supply.**
2. **How is price elasticity of supply calculated?**
3. **If price elasticity of supply equals 2.5, this means that a 10% increase in price will cause quantity supplied to increase by _____ %.**
4. **If price elasticity equals zero, then this would mean that when price changes quantity supplied would change by _____ %.**
5. **How does the factor 'time' affect price elasticity of supply?**
6. **Why would the supply of pizza be relatively price elastic?**

3.3 Income and cross elasticity of demand

- **Income elasticity of demand**

There are two other types of elasticity - both linked to the demand curve. **Income elasticity of demand** (E_y) refers to the responsiveness of demand to a change in consumer income. The formula for calculating the income elasticity of demand is:

$$E_y = \frac{\% \text{ change in quantity}}{\% \text{ change in income}}$$

Suppose a person's income increased from \$1000 per week to \$1100 (10 per cent increase), and that person decided to increase their weekly pizza consumption from 3 to 4 pizzas (33 per cent increase). Using the formula above, the income elasticity (E_y) would be:

$$E_y = \frac{33\%}{10\%}$$

$$E_y = 3.3$$

Income elasticity can be either positive or negative. A normal good has a positive coefficient, while an inferior good has a negative coefficient.

For this consumer, pizzas are a normal good and are income elastic. Economists distinguish between normal goods and inferior goods on the basis of their income elasticities. A **normal good** has a positive income elasticity ($E_y > 0$). As income rises, demand increases. Normal goods can be further divided into those which are relatively income elastic ($E_y > 1$) and those which are relatively income inelastic ($0 < E_y < 1$). Income elastic goods are often luxury goods such as restaurant meals, overseas travel, champagne and caviar. Income inelastic goods tend to be necessities such as bread, milk, electricity and water. If you were in business would you rather sell goods that are income elastic or income inelastic?

An **inferior good** has a negative income elasticity ($E_y < 0$). As incomes increase, demand for the product actually falls. Inferior goods include plain wrap, generic brand products. Brands that are considered to be of basic, low quality would be regarded as inferior goods. Income elasticity can be useful in predicting which industry sectors will grow as incomes in the community rise. The growth in industries such as tourism, personal fitness and mobile phones reflects their strong income elasticity. Often goods that are income elastic are also price elastic (e.g. luxury goods) and goods that are income inelastic are also price inelastic (e.g. necessity type goods).

• **Cross elasticity of demand**

Cross elasticity of demand (E_{ab}) measures the responsiveness of the demand for one good (a) to a change in the price of a related good (b). Cross elasticity can reveal whether goods are likely to be substitutes or complements. The formula for calculating the cross elasticity of demand is:

$$E_{ab} = \frac{\% \text{ change in } Q_a}{\% \text{ change in } P_b}$$

Substitute goods have a positive cross elasticity while complements have a negative cross elasticity

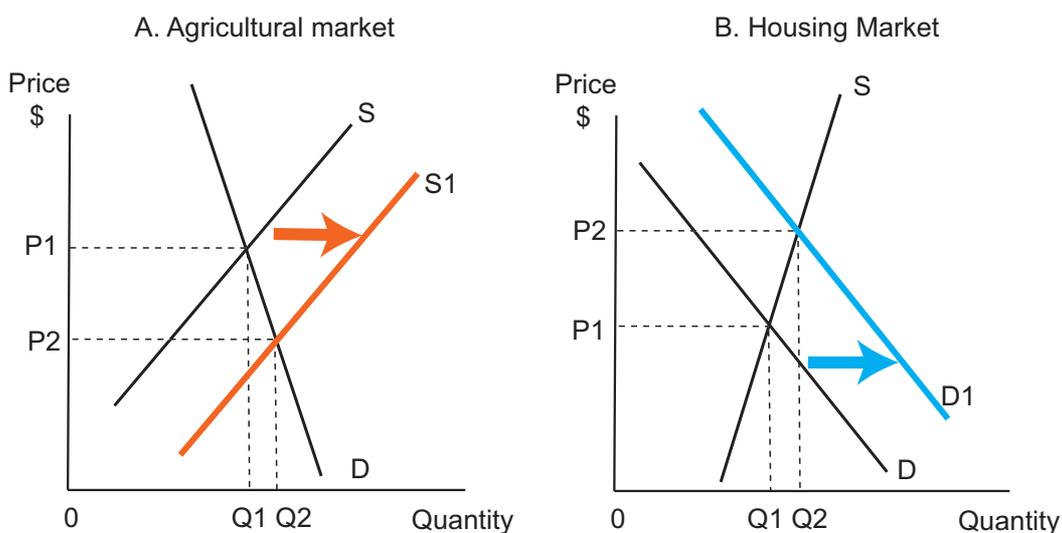
Substitute commodities such as butter and margarine, or tea and coffee, have a positive cross elasticity of demand. If the price of butter rises, then the demand for margarine will increase (move in the same direction). Complementary goods such as petrol and cars have a negative cross elasticity of demand. A rise in the price of cars will cause the demand for petrol (its complement) to decrease.

Review Quiz

1. Define income elasticity of demand.
2. What is the formula for calculating income elasticity of demand?
3. Would a normal good have a positive or a negative income elasticity?
4. Define cross elasticity of demand.
5. What is the formula for calculating cross elasticity of demand?
6. Would the cross elasticity for substitute goods be negative or positive?

3.4 Applications of price elasticity

The concept of elasticity is very important in explaining how markets work and how consumers and producers respond to changes in both demand and supply. Consider the market for agricultural goods (Panel A in figure 3.7). The demand for these goods is relatively inelastic (steep D curve). Over time, supply increases due to improvements in technology and productivity. An increase in supply will result in price falling and quantity rising, but because demand is inelastic, total income received by the agricultural sector falls. The reason is that when demand is inelastic, an increase in production results in a large fall in price, but only a small increase in quantity sold. Farming communities have tended to contract over time because of the nature of elasticity.

Figure 3.7 Applications of price elasticity

When demand is inelastic, an increase in supply results in a large fall in P but only a small rise in Q.

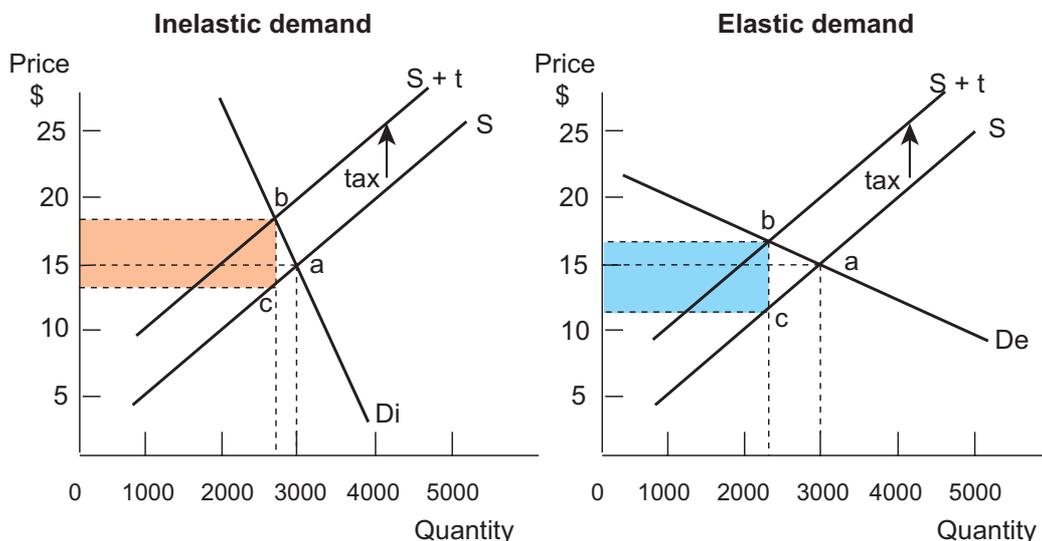
When supply is inelastic, an increase in demand results in a large rise in P but only a small rise in Q.

Panel (b) depicts the housing industry. The supply curve for housing is very inelastic because it takes a considerable time to construct houses. Over time, demand increases due to rising incomes and rising population. An increase in demand leads to a rise in price and an increase in quantity, but when supply is inelastic, most of the effect is concentrated on price. The price of housing increases substantially, while quantity only increases modestly. The purpose of these two examples is to show that having some knowledge of price elasticity can be useful in predicting price and quantity changes over time.

Another important application of price elasticity concerns the analysis of government taxes on goods and services. Taxes on goods and services are an important source of government revenue. In Australia there is a goods and services tax (GST) levied on most goods and services and excise duties which are levied on petrol, alcohol and tobacco. When a tax is placed on a good it creates a wedge between the price paid by consumers and the price received by producers. A tax will increase the price paid by consumers, decrease the price received by producers and decrease the quantity sold. Taxes obviously have a negative impact on an industry. The GST is a very broad consumption tax covering most goods and services and is set at a level of 10 per cent.

Excise taxes are much larger and are directed at goods with very inelastic demand, such as petrol, alcohol and tobacco. Governments often justify large taxes on these goods because they can impose significant health and environmental costs on

Figure 3.8 Taxes and price elasticity



Before the tax, price is \$15 and quantity exchanged is 3000. A \$5 tax shifts the supply curve to $S + t$. After the tax, buyers pay \$18 and sellers receive \$13. Quantity sold falls to 2800.

Before the tax, price is \$15 and quantity exchanged is 3000. A \$5 tax shifts the supply curve to $S + t$. After the tax, buyers pay \$17 and sellers receive \$12. Quantity sold falls to 2300.

society. Taxing goods that are inelastic in demand have a number of advantages. First, because demand is inelastic, a tax will be very effective in raising revenue. Second, taxes on inelastic goods will have a marginal impact on quantity - this means that the effect on industry output and employment will not be as great compared to a tax on a good with an elastic demand.

The effect of placing a tax on a good is shown in Figure 3.8. Panel A shows a market where demand is relatively inelastic, while panel B shows a market with a relatively elastic demand curve. A tax is a cost to the producer and is shown as a decrease in supply. The supply curve will shift by the amount of the tax. Initially the market is in equilibrium at a price of \$15 and a quantity of 3000 units. Suppose that the government levies a \$5 sales tax on each unit sold. The tax will cause the supply curve to shift up vertically by \$5 - the supply curve shifts from S to $S+t$.

What is the effect of the tax? The tax has shifted the market equilibrium from point a to point b in both panels of figure 3.8. Applying a tax to a good will always increase the equilibrium price and decrease the equilibrium quantity. Will a \$5 tax cause the price to increase by \$5? The answer is no! Price will rise but always by less than the size of the tax. Why? Because the demand curve is downward sloping. How much the price rises due to the tax will depend on price elasticity. When demand is inelastic, the increase in price is much greater than when demand is elastic. How much will quantity sold fall? Again it will depend on price elasticity. The fall in quantity will be much smaller when demand is inelastic than when demand is elastic.

In the case where demand is inelastic, the after tax price has increased from \$15 to \$18 and the after tax quantity has fallen from 3000 to 2800. Consumers pay the new price of \$18 but producers only receive \$13 - the difference is the \$5 tax which goes to the government. Who bears the burden or the incidence of the tax? Notice that consumers pay an extra \$3 while producers receive \$2 less. Most of the burden of the tax falls on the consumer because demand is inelastic. The tax revenue the government receives is shown by the shaded rectangle. It amounts to \$14,000 - the tax (\$5) multiplied by the quantity sold (2800).

In the case where demand is elastic, the after tax price has increased from \$15 to \$17 and the after tax quantity has fallen from 3000 to 2300. Consumers pay the new price of \$17 but producers only receive \$12 - the difference is the \$5 tax which goes to the government. Who bears the burden or the incidence of the tax in this instance? Notice that consumers now only pay an extra \$2 while producers receive \$3 less. Most of the burden of the tax falls on the producer because demand is relatively elastic. The tax revenue the government receives is shown by the shaded rectangle. It amounts to \$11,500 - the tax (\$5) multiplied by the quantity sold (2300).

Notice that both the incidence of the tax and the amount of tax revenue is determined by price elasticity:

- ***the incidence or burden of a tax will fall more on the consumer when demand is relatively inelastic compared with supply (or fall more on the producer when demand is relatively elastic compared with supply).***
- ***tax revenue will be greater on goods with inelastic demand.***

In the special case when demand is perfectly inelastic (vertical D curve), price will rise by the full amount of the tax and all the incidence will be on the consumer. If demand was perfectly elastic (horizontal D curve) then price would not increase at all and all the burden of the tax would fall on the producer.

So it makes economic sense for governments to impose taxes on goods such as petrol, alcohol and cigarettes - goods with very inelastic demand. These taxes will be very effective in raising revenue and they also will have a modest effect on production and employment within the industry. One could also argue that it is morally correct to impose large taxes on these goods because they impose large external costs on society - carbon emissions and pollutants in the case of petrol, and health and social costs in the case of alcohol and tobacco. Would consumers prefer taxes to be levied on elastic or inelastic goods? In the case of elastic goods, consumers have the ability to switch to a substitute good. Notice in figure 3.8 when a tax is levied on an elastic good, the price rises by only a small amount. Consumers, in other words, can easily avoid the tax by switching to a substitute good. In the case of inelastic goods, such as petrol, it is not possible to find a close substitute.

Figure 3.9 A summary of elasticities

Type	Value	Meaning
Price elasticity of demand (E_d)		
<i>elastic good</i>	<i>greater than 1</i>	<i>the % change in qty is greater than the % change in P</i>
<i>inelastic good</i>	$0 > E_d < 1$	<i>the % change in qty is less than the % change in P</i>
Income elasticity of demand		
<i>normal good</i>	<i>positive</i>	<i>an increase in income increases demand</i>
<i>inferior good</i>	<i>negative</i>	<i>an increase in income decreases demand</i>
Cross elasticity of demand		
<i>substitute goods</i>	<i>positive</i>	<i>an increase in the price of good X increases the demand for good Y</i>
<i>complement goods</i>	<i>negative</i>	<i>an increase in the price of good X decreases the demand for good Y</i>
Price elasticity of supply (E_s)		
<i>elastic</i>	<i>greater than 1</i>	<i>the % change in qty is greater than the % change in P</i>
<i>inelastic</i>	$0 > E_s < 1$	<i>the % change in qty is less than the % change in P</i>

4 Market efficiency



Learning Objectives

In this chapter you will learn about:

- *the concept of economic efficiency*
- *the benefits to consumers from participating in a market*
- *the concept of consumer surplus*
- *the benefits to producers from participating in a market*
- *the concept of producer surplus*
- *total surplus and why it is maximised at market equilibrium*
- *the efficiency of price controls, taxes and subsidies*

Introduction

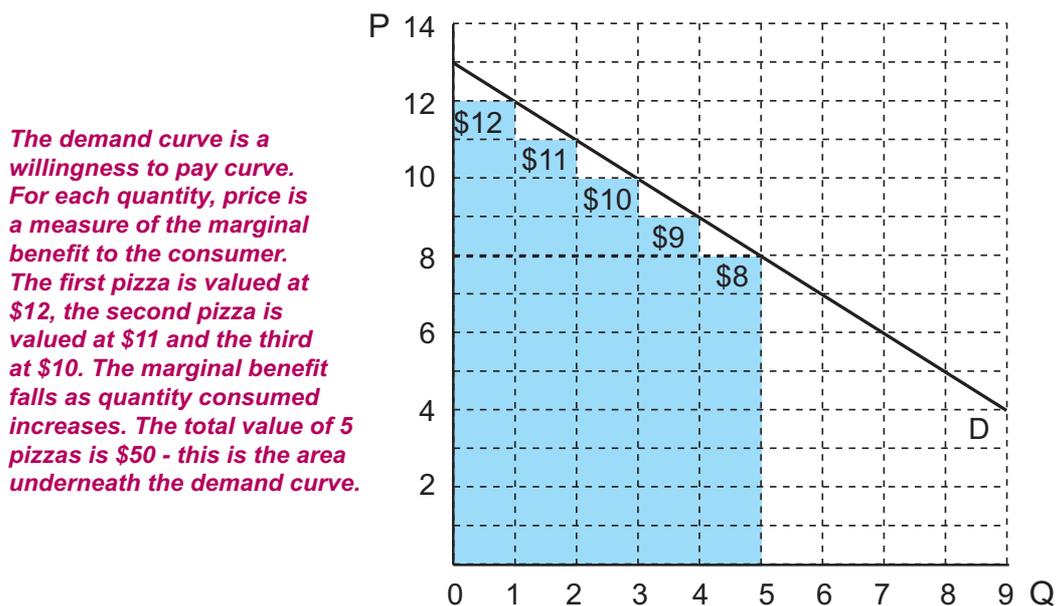
For a long time economists have known that competitive markets are a good way to organise economic activity. A competitive market is the result of thousands of individual buyers and sellers interacting with one another. Demand reflects the intentions of buyers and is a measure of the benefits buyers receive from consuming goods and services. Supply reflects the intentions of sellers and is a measure of the costs sellers bear in producing goods and services. The competitive market establishes an equilibrium price and quantity when demand equals supply. This means that the market allocates resources in such a way that at the margin, the price consumers pay matches the cost of resources used to produce the particular good or service. Price is a way to measure the benefit that consumers obtain from consuming a good and at the same time, price is a measure of the value of resources that have been used to produce the good. Economists believe that this makes markets a very effective and efficient way to allocate resources.

Are there other ways to allocate resources other than via markets? In a planned economy, a central authority determines what is to be produced rather than consumers. The central authority decides the priorities for production and then sets out very detailed plans for the allocation of resources. If price is used it may not relate to the cost of supply. Incomes are also set by the planning authority which determines how much a household can consume. Is this efficient? Will a planned economy produce what society wants at the lowest cost? The answer to both questions is no! In fact we have witnessed the demise of central planning in several eastern European countries as well as Russia and even China.

What does **efficiency** mean? It means producing the goods that society wants at the lowest possible cost. An efficient outcome means that it is not possible to make someone better off without making someone else worse off. Conversely, when an outcome is inefficient, it is possible to improve total well being in society by reallocating resources. Economists relate the term efficiency to making the best use of scarce resources. This is important because we do not want to waste any resources. We want to produce goods and services at the lowest cost, but we also want to produce the 'right' types of goods and services according to society's preferences. We will see how markets can be the best way to achieve efficiency.

4.1 Demand and consumer surplus

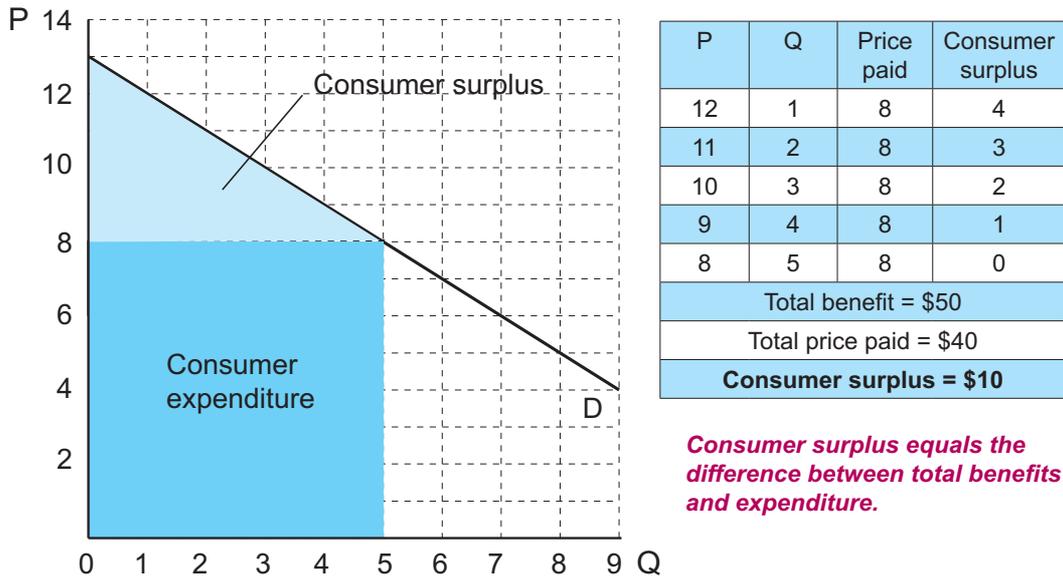
We begin by focussing on the demand curve as a way to measure the benefits consumers obtain from markets. A demand curve is a willingness to pay curve. A demand curve reflects the maximum price a consumer is prepared to pay for a particular good. We will use an example of an individual consumer, James, buying pizza. Figure 4.1 shows James' demand curve for pizza. The demand curve depicts the law of demand - James is prepared to buy more pizza as the price falls. Suppose that the market (equilibrium) price for pizza is \$8. At this price, James' weekly demand is 5 pizzas. James spends \$40 on pizza per week. But is this what the 5 pizzas are worth to James?

Figure 4.1 Demand and willingness to pay

Remember, the demand curve shows the maximum price a consumer is willing to pay. The demand curve reflects the marginal benefits a consumer gets from the good, so a demand curve is also a marginal benefit curve. James values the 5th pizza at \$8, but notice he values the first pizza at \$12, the second pizza at \$11, the third pizza at \$10 and the fourth pizza at \$9.

So, James actually values all 5 pizzas at \$50 - the sum of \$12, \$11, \$10, \$9 and \$8. The total value of the 5 pizzas is measured as the area under the demand curve. A point on the demand curve measures the price or marginal benefit of an additional pizza. If James were to consume more pizzas, the marginal value would fall but the total value would increase. For example, the sixth pizza has a value of \$7 and the total value of 6 pizzas is \$57.

Let's recap - James buys 5 pizzas for \$8 each and spends \$40. But James actually values the 5 pizzas at \$50. The difference of \$10 is James' surplus value. Economists call this bonus value, consumer surplus. **Consumer surplus** is the difference between what a consumer is prepared to pay and what they actually pay in the market. It is like profit for the consumer. Figure 4.2 demonstrates how we can measure consumer surplus. In our example, James pays \$8 for each of the 5 pizzas he purchases. But he would be willing to pay \$12 for the first pizza - he earns a consumer surplus of \$4 on the first pizza. On the second pizza, James' consumer surplus is \$3 - the difference between the price \$8 and \$11 which represents the price James would be willing to pay for the second pizza. Consumer surplus on the third pizza is \$2 (\$10 - \$8) and for the fourth it is just \$1 (\$9 - \$8). Notice that consumer surplus for the 5th pizza is zero. In Figure 4.2 we can show consumer surplus as the area above the price line and below the demand curve.

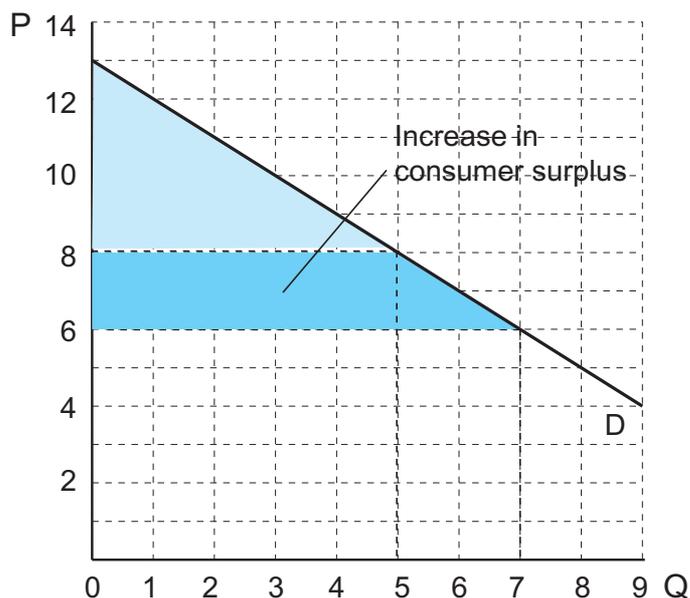
Figure 4.2 Demand and consumer surplus

Consumer surplus is a very useful concept because it is a measure of the economic well-being for consumers. Every consumer likes a bargain. You always feel much better buying something if you pay less than what you are prepared to pay - this is your consumer surplus. An increase in consumer surplus means that the consumer is better off - their economic welfare has increased.

For example, If the market price of pizza decreased to \$6 due to an increase in supply, consumers would increase their consumption and this would increase consumer surplus - consumers are now better off because they pay less and consume more. This is shown in figure 4.3. At the new price of \$6, James, our consumer, is now buying 7 pizzas. The increase in consumer surplus is shown by the darker shaded region. Remember that if consumer surplus rises in a market, then this indicates that consumers are happier - their economic well-being has increased.

Review Quiz

1. Why is a demand curve called a 'willingness to pay' curve?
2. What happens to marginal benefit as consumption increases?
3. What happens to total benefit as consumption increases?
4. Define consumer surplus.
5. Calculate your consumer surplus if you pay \$700 for a new mobile phone but your maximum price is \$1000.
6. Is it possible for your consumer surplus to be negative?

Figure 4.3 An increase in consumer surplus

If market price falls there will be an increase in consumer surplus because consumers will buy more at a lower price. Their economic welfare will increase. Changes in consumer surplus are a better measure of welfare than changes in consumer expenditure.

Uber and consumer surplus

You need to get to the airport in a hurry. You check your Uber app which says it will cost \$50. You would be prepared to pay \$80 – the \$30 difference is what economists would call ‘consumer surplus’. It represents the difference between what you pay and what you’re willing to pay. Understanding consumer surplus is important to businesses because it can reveal information about how much people are prepared to pay for things. But calculating it in the real world can be pretty difficult, because companies can’t simply ask you how much you are willing to pay for stuff. It would be in your best interest to always lie!

Thanks to its surge pricing system and a vast collection of customer statistics, Uber is a rare exception. Using nearly 50 million individual-level observations, a group of economists estimated that Uber generated roughly \$3 billion in consumer surplus each year between the service’s four largest U.S. cities (Chicago, Los Angeles, New York, and San Francisco). Their analysis suggests that Uber’s overall consumer surplus for the United States in a year was approximately \$7 billion. In other words if Uber didn’t exist, then the economy would be \$7 billion worse off!

How was the value estimated? Uber’s surge system is always changing prices to reflect supply and demand. This provides data on how many customers were actually willing to pay more - and how much more - at every price point. This means that economists can use this information to construct an actual demand curve for Uber services and from this measure consumer surplus - the area below the demand curve and above the price line.

Source: adapted from Bloomberg News

4.2 Supply and producer surplus

Let's now turn to the supply side of the market. Do producers receive a similar surplus value like consumers. The supply curve reflects the minimum price that producers are willing to sell their products. The supply curve can be thought of as a willingness to accept curve. The minimum price reflects the producer's costs of production. The supply curve can also be labelled a marginal cost curve. Suppose that James is buying his pizzas from Brittany. Brittany's supply curve of pizzas is shown in Figure 4.4. We assume that the equilibrium price of pizzas is \$8. Brittany is willing to sell James 5 pizzas. Brittany receives \$40 in revenue but would she have been willing to supply the 5 pizzas for less?

Figure 4.4 shows that Brittany would have been willing to sell the first pizza for \$4, the second pizza for \$5, the third for \$6, the fourth for \$7 and the fifth for \$8. But Brittany receives \$8 for each of the 5 pizzas. Brittany's minimum supply price is \$30 - the sum of 4, 5, 6, 7, and 8. This represents the cost of supplying the 5 pizzas. The total cost of the 5 pizzas is measured as the area under the supply curve. A point on the supply curve measures the marginal cost of an additional pizza. If Brittany were to produce more pizzas, the marginal cost would rise. For example, the marginal cost to produce the sixth pizza is \$9 and the total cost of 6 pizzas is \$39. Let's recap - Brittany sells 5 pizzas for \$8 each and receives \$40. But Brittany's actual cost to supply the 5 pizzas is just \$30. The difference of \$10 is Brittany's surplus value. Economists call this bonus value, producer surplus. **Producer surplus** is the difference between what a producer is willing to receive (minimum supply price or cost of production) and what they actually receive in the market. It is like profit for the producer.

Figure 4.4 Supply and willingness to accept

The supply curve is a willingness to accept curve. For each quantity, price is a measure of the marginal cost to the producer. The producer is willing to supply the first pizza for \$4, the second for \$5 and the third for \$6. The minimum supply price or cost for 5 pizzas is \$30 - this is the area underneath the supply curve.

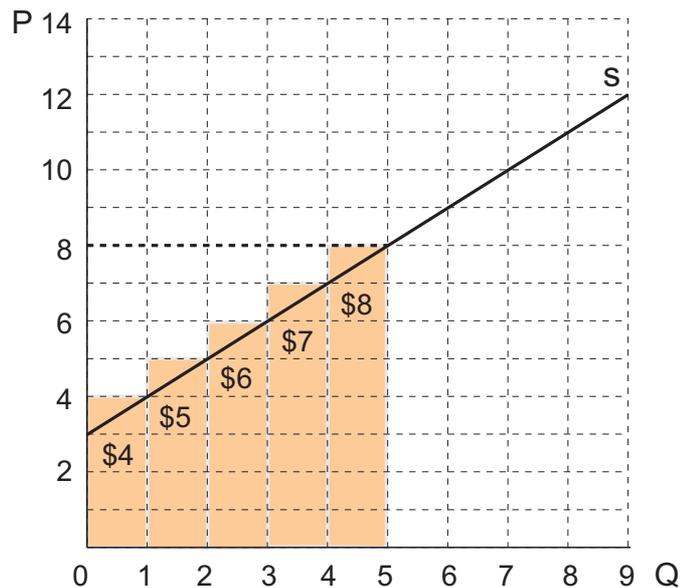


Figure 4.5 below demonstrates how to calculate producer surplus. In our example, Brittany receives \$8 for each of the 5 pizzas. But she would be willing to sell the first pizza for just \$4. This would cover her minimum cost for the first pizza. This means that on the first pizza, Brittany earns a producer surplus of \$4. For the second pizza, Brittany would be willing to sell for \$5 but she receives \$8 and so her producer surplus for the second pizza is \$3 - the difference between the market price \$8 and the price Brittany is willing to accept. For the third pizza, producer surplus is \$2 (\$8 - \$6) and for the fourth it is just \$1 (\$8 - \$7). Notice that producer surplus for the 5th pizza is zero - Brittany's minimum price is \$8 which is equal to the market price. In Figure 4.5 we can show producer surplus as the area below the price line and above the supply curve. Producer surplus is also a very useful concept because it is a measure of the economic well-being for producers. Every producer loves to make a profit. As a seller you always feel much better selling something if you receive more than what it cost to produce - this is your producer surplus. An increase in your producer surplus means that you are better off - your economic welfare has increased.

So the producer's total revenue (price x quantity) comprises two parts - the cost of production and producer surplus. But it is the change in producer surplus which is used to measure the well-being of producers. An increase in producer surplus means that producers are better off - their economic welfare has increased. For example, If the market price of pizza increased to \$10 due to an increase in demand, producers would increase their production and this would increase producer surplus - producers are now better off because they receive a higher price and sell more. This is shown in figure 4.6. At the new price of \$10, Brittany, our producer, is now selling 7 pizzas. The increase in producer surplus is shown by the darker shaded region. Remember that if producer surplus rises in a market, then this indicates that producers are happier - their economic well-being has increased.

Figure 4.5 Supply and producer surplus

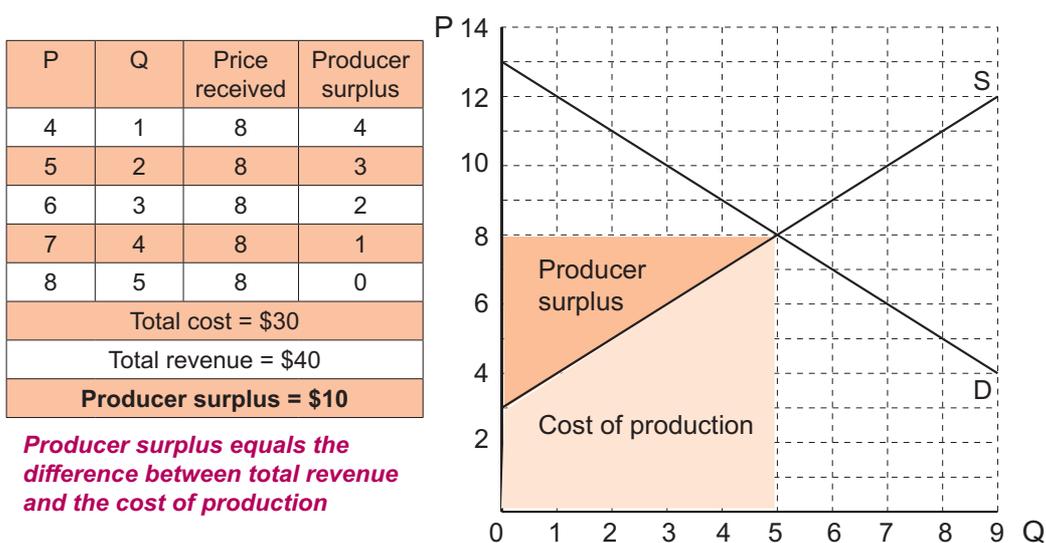
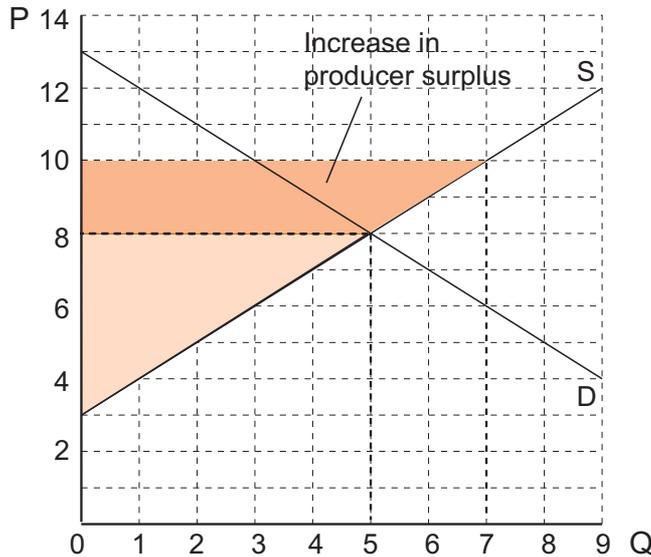


Figure 4.6 An increase in producer surplus



If market price rises there will be an increase in producer surplus because producers will sell more at a higher price. Their economic welfare will increase.

Changes in producer surplus are a better measure of welfare than changes in total revenue.

Review Quiz

1. Why is a supply curve called a 'willingness to accept' curve?
2. What happens to marginal cost as production increases?
3. Explain why a seller would prefer to receive a higher price than a lower price?
4. Define producer surplus.
5. Calculate your producer surplus if you receive \$10 each for 10 pizzas but your total production cost is \$60.

4.3 Total surplus

In the example we have used you would have noticed that both consumer and producer surplus are equal to \$10. This is just a coincidence - they do not have to be equal, in most cases they are likely to be quite different. Consumer and producer surplus will also vary between different consumers and producers. What is important is the sum of consumer and producer surplus across all buyers and sellers in the market. We refer to this as total surplus. **Total surplus** is a measure of the net benefits to society from the production and consumption of the good. Total surplus is the sum of consumer and producer surplus. It is a measure of the net benefits society receives after taking into account the cost of resources:

$$\text{Total Surplus} = \text{Consumer Surplus} + \text{Producer Surplus}$$

$$\text{Total Surplus} = \text{Total Benefits} - \text{Total Costs}$$

The aim of society should be to increase total surplus in every market. Total surplus is an extremely important concept because it provides us with a measure of economic efficiency. If we can allocate resources so that total surplus is maximised in each market, then we are using the economy's resources in the most efficient way. Total surplus reflects the net benefits society obtains from the consumption and production of a particular good or service. It provides a method to measure how well the economy is solving the economic problem. Only when total surplus is being maximised can we say that we have achieved an efficient allocation of resources.

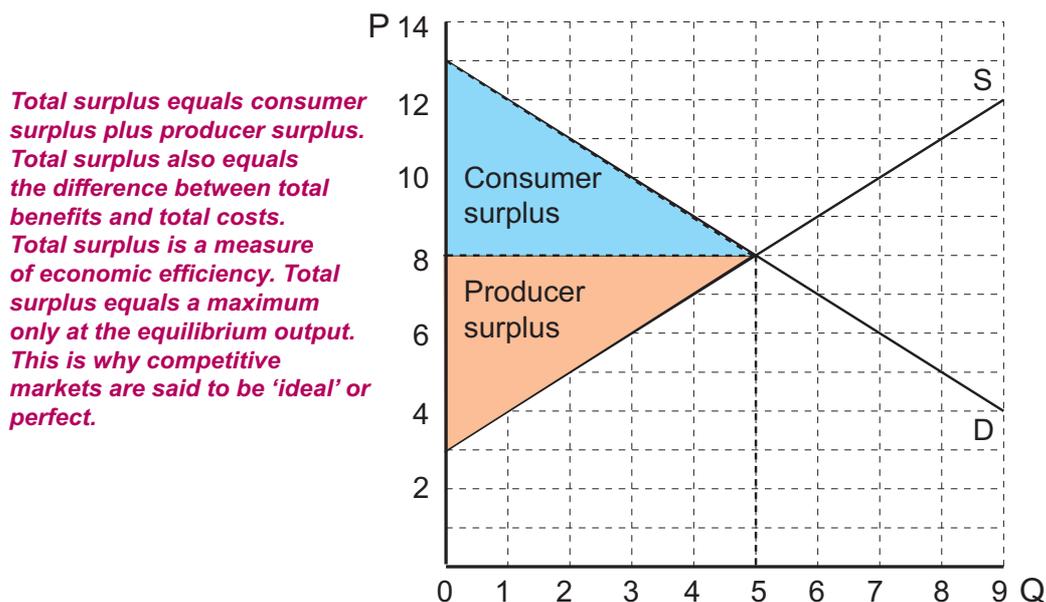
Economic Efficiency occurs when total surplus is at a maximum

Total surplus is only maximised at equilibrium

Figure 4.7 combines our previous demand curve and supply curve to show the equilibrium price of \$8 and equilibrium quantity of 5. Total surplus is the combined area of consumer surplus and producer surplus. The important point to note is that total surplus is only maximised at the equilibrium - where demand equals supply. This is one of the most powerful conclusions in the whole theory of economics! What it is saying is that a competitive market is the best way to allocate scarce resources because it leads to the greatest gain for society. Only a competitive market produces where demand equals supply, so only a competitive market will maximise total surplus. As long as market demand and supply capture all benefits and costs, then the competitive output is the optimal or most efficient output.

This is why economists advocate competitive markets and why they promote the use of prices to allocate resources in the economy. Markets are able to reflect the buying intentions of consumers and the selling intentions of producers. Can we prove that

Figure 4.7 Equilibrium and total surplus



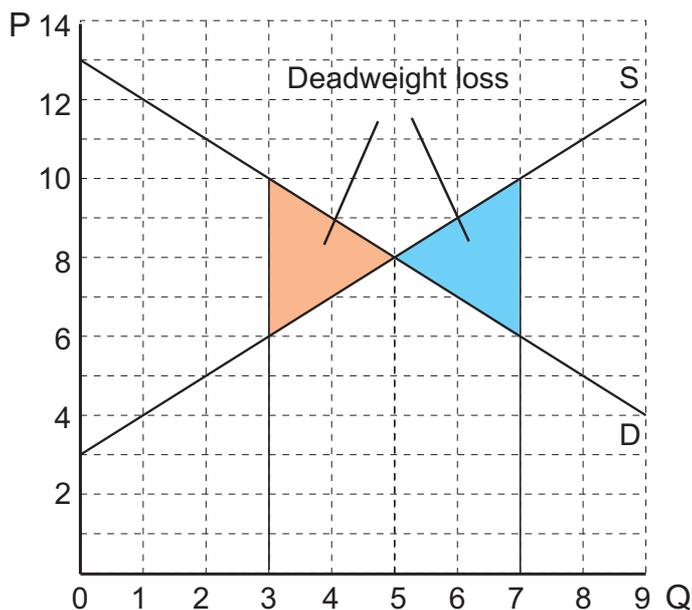
the equilibrium output is the best or most efficient output? Yes we can, simply by choosing an output that is either less than or greater than the equilibrium output and seeing what happens to total surplus. For example, in Figure 4.7, if the actual market quantity was 4 pizzas or less, total surplus would be lower than it is at a quantity of 5. To the left of equilibrium, marginal benefit (D) exceeds marginal cost (S) - total surplus could be increased by increasing the output of pizzas. Similarly, if the market quantity was 6 pizzas or more, total surplus will be lower than at the equilibrium quantity. With an output of 6, marginal cost (S) now exceeds marginal benefits (D), so society is actually making a loss by producing the sixth pizza.

Deadweight loss

When total surplus is reduced because of either under or overproduction, it is referred to as a **deadweight loss**. This is shown in Figure 4.8. A deadweight loss refers to an avoidable decrease in total surplus because something has prevented the market from producing the optimal output. Figure 4.8 shows the deadweight loss (the decrease in total surplus) if the market produces a quantity that is either greater than or less than the equilibrium quantity.

Chapter 5 investigates some of the important types of market failure that can create a deadweight loss. One example is monopoly. Firms in these market structures use their market power to restrict production in order to increase price. This results in underproduction and a decrease in total surplus (a deadweight loss). An example of overproduction is when an industry pollutes the environment. When firms pollute, they reduce their own private production costs, but impose external costs on the rest of society. They overproduce because they do not pay for the costs of pollution

Figure 4.8 Inefficiency - deadweight loss



A deadweight loss occurs if the market produces a different output than the equilibrium output. Total surplus is always maximised at equilibrium. Producing less than or more than the equilibrium output results in a decrease in economic welfare.

and the market allocates too many resources to the industry. An important role for the government is to address some of the weaknesses of the market economy and hopefully resolve situations that can cause a deadweight loss.

It is important not to confuse a change in market conditions with a deadweight loss. Markets are continually changing - prices and quantities fluctuate in response to changes in demand and supply. For example, consider the banana market when a cyclone destroys much of the banana crop in northern Australia. Queensland is often affected by tropical cyclones which can have a devastating impact. Initially, there is a large decrease in supply which causes banana prices to soar and quantity demanded to fall. Obviously both consumers and producers are adversely affected, but it is important not to confuse a shift in equilibrium with a deadweight loss. As long as the market is free to move to a new equilibrium, then the resulting outcome is regarded as efficient. In the banana example, a cyclone destroying banana plantations will cause price to rise and quantity to fall. Total surplus at the new equilibrium will be lower - society is worse off - compared with the old equilibrium. But the outcome is still efficient because at the new equilibrium, total surplus will be maximised. There would only be a deadweight loss if the market was prevented from shifting to its new equilibrium position. For example, if the government introduced a new banana law preventing banana prices from rising.

Review Quiz

- 1. Define total surplus?**
- 2. How is total surplus calculated?**
- 3. Which is more important - consumer surplus or producer surplus?**
- 4. At what price is total surplus maximised?**
- 5. What is meant by 'a deadweight loss'?**

4.4 Government policies that reduce economic efficiency

Sometimes when governments intervene in markets they may decrease economic efficiency because the policy they introduce may distort the price system and lead to either under or over production. In this section we can use the concepts of consumer and producer surplus to evaluate a number of government policies that affect markets. These include:

- market restrictions
- price controls
- taxes on goods and services
- subsidies paid to certain industries

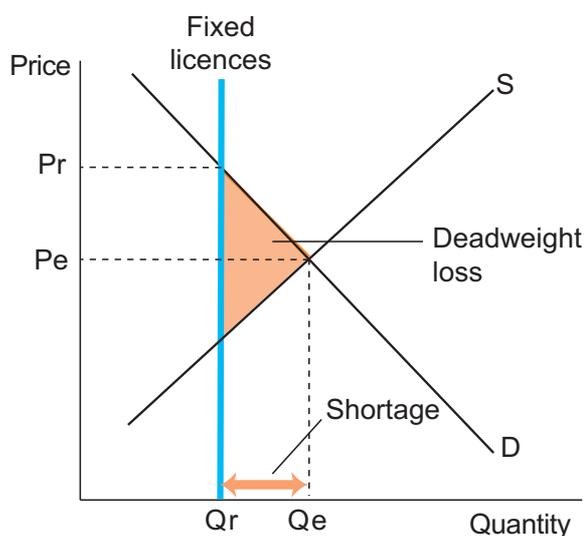
Consider the taxi market in most Australian capital cities such as Perth and Sydney, prior to the introduction of Uber. Taxi licence restrictions exist in all Australian States, and have brought about a steady decline in the number of taxis per head of

population. The cost of a taxi licence varied between \$300,000 to \$700,000. The price increased steadily over the years as State Governments did not issue sufficient new licences to meet increasing customer demand. The restriction of taxi licences creates high prices (taxi fares) and excess demand - long taxi queues at taxi ranks, especially at peak periods. Compare this with less regulated taxi markets in other countries, such as Singapore. Taxi fares are much cheaper and there is no waiting time. This is because the taxi market is more competitive and is not restricted by the government.

The taxi industry in Australia and the government had long argued that taxi regulation was needed and that it actually benefited the community. Economists would argue that most forms of industry regulation tend to benefit the industry (higher profits) and the government (higher licence fees) rather than consumers. This viewpoint was vindicated in a major review of the industry by the Productivity Commission where they were unable to identify any benefits to the community that would justify the restrictions on taxi numbers. The National Competition Council also came to a similar conclusion: *“The taxi industry is virtually alone among consumer services in having laws that restrict the actual number of taxis providing services. No compelling argument can be made to justify these restrictions”*.

Figure 4.9 uses the demand/supply model to show the effect of regulation on the taxi market. If there was no regulation, the market would reach a competitive equilibrium where demand equals supply. The market price (P_e) and quantity (Q_e) would be efficient. Total surplus would be maximised at the competitive equilibrium. But if the government regulates the market and restricts supply through a quota of taxi licences then the optimal price and quantity will not be achieved. The regulation will result in a deadweight loss and a decrease in economic welfare in the taxi market. In figure 4.9, licences are restricted to Q_r - the supply of taxis is effectively fixed

Figure 4.9 The taxi market



A competitive taxi market operates where demand equals supply - at the equilibrium P_e and Q_e , total surplus is maximised. Taxi regulation of licences results in a fixed supply of taxis. This results in shortages and higher prices. The regulated quantity is reduced to Q_r and as a result average taxi fares rise to P_r . By restricting the quantity of taxi licences total surplus is decreased - there is a deadweight loss.

and becomes a vertical line. This causes price to rise to P_r and creates a shortage. Because the market is restricted, total surplus is decreased, creating a deadweight loss. Over time, as the population grows, demand for taxi services is likely to increase which will lead to a bigger shortage and a larger deadweight loss. Uber is the new, more competitive taxi-like service that is now challenging the taxi monopoly in most capital cities in both Australia and overseas. It has increased competition in the taxi market, lowering fares and improving service. Uber has become very popular with many consumers because the service is quicker, more reliable and generally cheaper. Uber is an example of the market reacting to an overregulated industry.

Price controls

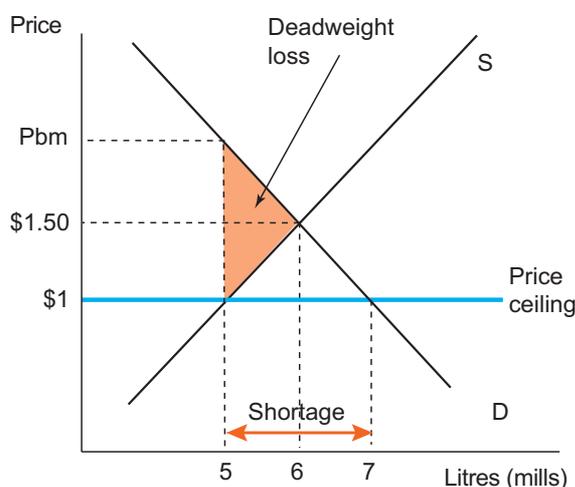
Price controls are government regulated prices that set prices either above or below the equilibrium price. There are two types of price controls known as price ceilings and price floors. A **price ceiling** is a legislated maximum price that sellers are allowed to charge in the market. A price ceiling is designed to benefit consumers by keeping the price below the market clearing price. Consumers may have lobbied the government to reduce the market price for an important good or service and so a maximum or ceiling price is set somewhere below the equilibrium price. Price ceilings are often justified on equity grounds - to help low income earners afford the good. For example, price ceilings have often been imposed in rental markets.

A price ceiling or maximum price set below the equilibrium will always create a shortage.

How does a price ceiling affect buyers and sellers and why does it lead to a decrease in total surplus (a deadweight loss)? Surely a policy that reduces the price of an essential good is beneficial for society. The answer is No! Figure 4.10 illustrates a price ceiling imposed on the petrol market. The market clearing or equilibrium price is \$1.50 and the equilibrium quantity is 6 million litres. Suppose that consumers believe that

Figure 4.10 A price ceiling or maximum price

A price ceiling is a maximum price that is set below the equilibrium price. Its purpose is to lower prices to consumers. A price ceiling results in a shortage because the quantity demanded exceeds the quantity supplied. A price ceiling may increase consumer surplus, but producer surplus decreases by more causing a deadweight loss in the market. Price ceilings often lead to black market prices (P_{bm}).



petrol prices are too high and lobby the government to reduce the price. In response, the government sets a maximum or ceiling price of \$1 per litre. Quantity demanded now increases to 7 million litres and quantity supplied contracts to 5 million litres. There is now a shortage of 2 million litres. Some consumers are happy - those that can buy the lower priced petrol, but there are now many consumers who miss out because there is a shortage of petrol that didn't exist at the equilibrium price of \$1.50. The shortage may also lead to a much higher black market price (P_{bm} in figure 4.10).

All sellers of petrol lose because they sell less petrol and receive a lower price. The price ceiling has resulted in an actual decrease in total surplus - a deadweight loss - shown by the shaded region in Figure 4.10. The price ceiling has resulted in the market failing to produce the optimal quantity and is therefore inefficient. Does the price ceiling improve equity? In other words, does the price ceiling help low income people? The answer is no! Can we guarantee that only low income people get the cheaper petrol? Not necessarily. The price ceiling has distorted the market, reduced both the quantity consumed and produced and may even lead to black market prices. Not only does the price ceiling reduce efficiency, it may also reduce equity as well. It is dangerous to try and use the price system for equity reasons. The government has better ways for helping low income groups through its tax and spending powers. Using the price system always has efficiency implications and will usually result in a decrease in economic welfare.

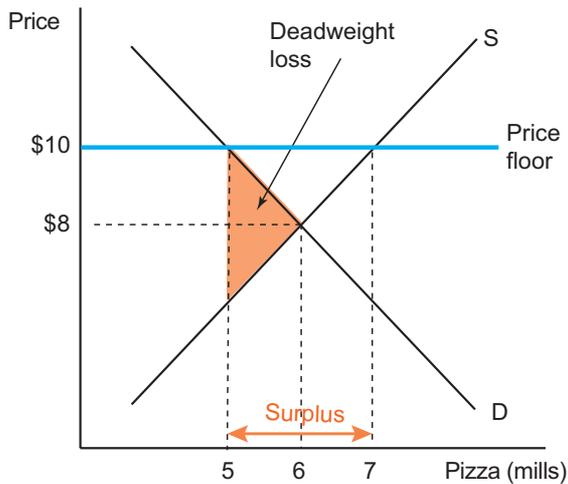
What about an opposite policy that sets a minimum price somewhere above the market price? A **price floor** is a legislated minimum price that sellers are allowed to charge in the market. Price floors are designed to help producers. Producers may have lobbied the government to increase the market price and so a minimum or floor price is set somewhere above the equilibrium price. Price floors are again justified on equity grounds - to help low income producers. For example, price floors have often been imposed in many agricultural markets to help farmers boost their incomes.

Figure 4.11 illustrates a price floor in the pizza market. The market clearing or equilibrium price and quantity is \$8 and 6 million pizzas. Suppose that the Pizza Makers Association lobbied the government to raise the price of pizza so that their members could earn a higher income. In response the Government imposes a minimum pizza price of \$10. Quantity demanded now contracts to 5 million pizzas,

A price floor or minimum price set above the equilibrium will always create a surplus.

while quantity supplied increases to 7 million. There is now a surplus of 2 million pizzas. Pizza producers as a group will now be happy because their revenue has increased from \$48 million (\$8 x 6 million) to \$50 million (\$10 x 5 million). This means that producer surplus has increased. But pizza consumers are now unhappy - they are paying more for their pizzas and receiving

less. This means that consumer surplus has decreased. What is the net result? The price floor has resulted in an actual decrease in total surplus - a deadweight loss - shown by the shaded region in Figure 4.11. The price floor has resulted in the market failing to produce the optimal quantity and is therefore inefficient. What if the government purchased the surplus pizzas and distributed these to the poor? Would that be efficient? The government would have to purchase the 2 million surplus

Figure 4.11 A price floor or minimum price

A price floor is a minimum price that is set above the equilibrium price. Its purpose is to raise the income of producers. A price floor results in a surplus because the quantity sellers are willing to sell exceeds the quantity buyers wish to purchase. A price floor may increase producer surplus, but consumer surplus decreases by more causing a deadweight loss in the market.

pizzas at \$10 each costing taxpayers \$20 million. Is this a good way to use taxpayers funds! Pizza producers might think so but it is highly inefficient and would cause the deadweight loss to be even larger.

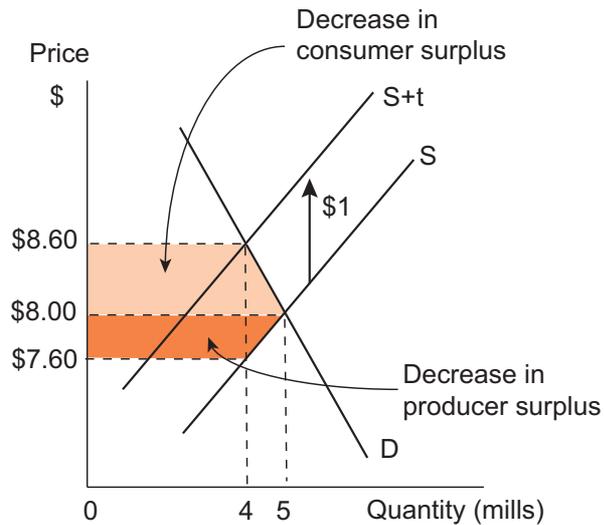
Taxes and subsidies

Governments levy **taxes** on goods and services in order to raise revenue for government spending programs. How does a tax affect the market and how does the tax affect the welfare of buyers and sellers? Is a tax efficient? To answer these questions we need to analyse the impact of a tax on consumer and producer surplus. Suppose that the government decides to introduce a new \$1 sales tax on pizzas. The top panel in Figure 4.12 shows the pizza market initially in equilibrium with a price of \$8 and quantity 5 million. The new tax is imposed on sellers causes a decrease in supply - the supply curve shifts up by the size of the tax. Will the price rise by \$1? The answer is no because the incidence of the tax is shared between the buyer and seller. In this example, the after tax price increases by \$0.60 to \$8.60 and quantity falls to 4 million. Consumers are clearly worse off because they must now pay a higher price and consume a lower quantity - consumer surplus decreases. Producers are also worse off with the tax, because they now receive a lower price (\$7.60) and sell fewer pizzas - producer surplus decreases.

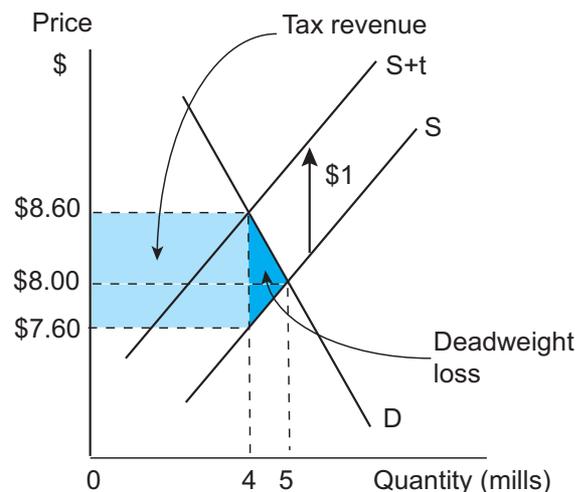
Does anybody gain from the tax? Remember the government will collect the tax revenue - in this instance the tax revenue will equal \$4 million (\$1 tax x 4 million pizzas). This is shown in the bottom panel of Figure 4.12. The government uses the tax revenue for government spending which will increase economic welfare for various groups in society. It doesn't matter whether the pizza consumers and producers receive the benefits of this government spending, as long as someone benefits. You might think that once the tax revenue is spent, it will offset the initial

Figure 4.12 The inefficiency of a tax

A tax levied on a good will have welfare effects on both buyers and sellers. When a tax is levied on producers, it shifts the supply curve up by the amount of the tax. A tax causes the market price to increase and quantity to fall. There is a decrease in consumer surplus because consumers pay more and receive less. There is also a decrease in producer surplus, because producers receive a lower price and sell a lower quantity.



But a tax raises revenue for the government and when spent will offset some of the decrease in total surplus. However, the tax revenue is less than the loss of total surplus. This means that a tax will always create a deadweight loss. Why? Because output in the market has decreased. This is why taxes are said to be inefficient.



loss in consumer and producer surplus. But this is not the case! The tax revenue is actually smaller than the combined decrease in consumer and producer surplus. In other words, the tax creates a deadweight loss because total surplus or economic welfare has been reduced. The reason is that the tax has caused the market to shrink - the output of pizzas has fallen. This lost economic activity is shown as a decrease in total surplus. The deadweight loss of the tax is shown by the shaded triangle in the bottom panel of Figure 4.12.

Does this mean that we should not have taxes because they are inefficient? The answer is no - the government must levy taxes in order to fund government spending. Taxes are a necessary part of economic life. However, we can use our economic theory to determine on which goods taxes should be imposed. The objective should be to

place taxes on goods where the deadweight loss will be minimised. What determines whether the deadweight loss will be big or small? Obviously the larger the tax, the greater the decrease in economic activity and the bigger the deadweight loss. But a second factor is also important - elasticity. If demand is relatively inelastic, then a tax will only have a small impact on quantity. This means that placing a tax on an inelastic good will result in a small deadweight loss. Placing a tax on a good with relatively elastic demand will cause quantity to fall by a significant amount so that the resulting deadweight loss will be relatively large. So there is a sound reason why governments usually place large taxes on goods such as petrol, alcohol and tobacco - the demand for these goods are highly inelastic.

Governments also pay **subsidies** to different groups in society. A subsidy is a grant paid to a producer with the purpose of reducing costs and increasing output. A subsidy can be thought of as a negative tax. How does a subsidy affect the welfare of buyers and sellers? Is a subsidy efficient? If a tax results in a deadweight loss, will a subsidy lead to an actual increase in total surplus? To answer these questions we need to analyse the impact of a subsidy on consumer and producer surplus. Suppose that the government decides to pay a \$1 subsidy to the pizza industry. The top panel in Figure 4.13 shows the pizza market initially in equilibrium with a price of \$8 and quantity 5 million. The new \$1 tax increases supply and shifts the supply curve down by the size of the subsidy. The price now decreases to \$7.40 and quantity rises to 6 million. Consumers are clearly better off because they now pay a lower price and consume a greater quantity - consumer surplus increases.

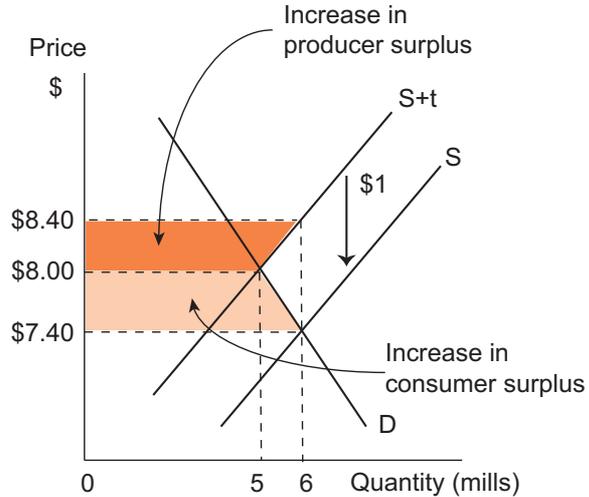
Producers are also better off with the subsidy, because they now receive a higher price of \$8.40 (\$7.40 paid by consumers plus the \$1 subsidy) and sell more pizzas - producer surplus increases. It would appear that a subsidy is efficient because it leads to a gain in both consumer and producer surplus. But this is not the case. We must subtract the cost of the subsidy. Remember the government must pay for the subsidy out of its tax revenue. How much will the subsidy cost?

The cost will equal the amount of the subsidy (\$1) times the new quantity of pizzas (\$6 million). The total cost will equal \$6 million. This is shown in the bottom panel of Figure 4.13 (shaded rectangle). Notice that the cost of the subsidy is greater than the combined increase in consumer and producer surplus. This means that the subsidy creates a deadweight loss because total surplus or economic welfare has been reduced. The deadweight loss of the subsidy is shown by the shaded triangle in the bottom panel of Figure 4.13. So a subsidy, just like a tax, is inefficient because it results in a deadweight loss. For a very long period, the Australian government paid subsidies to the Australian motor vehicle industry. Taxpayers had been covering the cost of each Australian-made car with subsidies equivalent to as much as \$50,000 for every employee directly involved in their manufacture. Car manufacturing died in Australia because the government could no longer afford to waste taxpayer dollars on an industry that had been inefficient and unsustainable for decades.

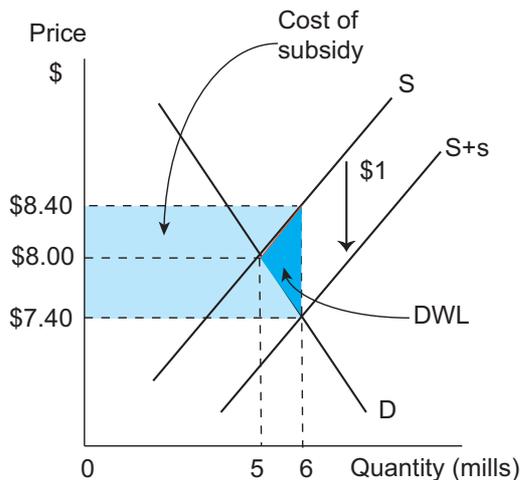
Both taxes and subsidies are inefficient - they both create a deadweight loss

Figure 4.13 The inefficiency of a subsidy

A subsidy paid to an industry will have welfare effects on both buyers and sellers. When a subsidy is paid to producers, it shifts the supply curve down by the amount of the subsidy. A subsidy causes the market price to decrease and quantity to rise. There is an increase in consumer surplus because consumers pay less (\$7.40) and receive more. There is also an increase in producer surplus, because producers receive a higher price (\$8.40) and sell a larger quantity.



But a subsidy must be paid for out of government revenue. The cost of the subsidy is greater than the combined increase in consumer and producer surplus. This means that a subsidy will always create a deadweight loss - a decrease in total economic surplus. So similar to taxes, subsidies are inefficient.



Review Quiz

1. What is a price ceiling? Who benefits from a price ceiling and who loses?
2. Why is a price ceiling inefficient?
3. What is a price floor? Who benefits from a price floor and who loses?
4. Why is a price floor inefficient?
5. Why does a tax create a deadweight loss?
6. Why does a subsidy create a deadweight loss even though it increases consumer and producer surplus?

4.5 The concept of equity

So far we have examined the efficiency of the market economy by introducing terms such as consumer, producer and total surplus. We were able to come to the conclusion that competition is good for society by ensuring that scarce resources are generally put to their best use. Are markets efficient? The answer is yes, because they maximise total economic surplus. But another important issue for economics to address is the issue of equity or fairness. Fairness is about how society's production (or income) is divided up amongst the population. A simple way to understand the difference in meaning between efficiency and equity is that efficiency is concerned with increasing the size of the economic pie, while equity is concerned with dividing up the economic pie into equal slices for everyone.

Do competitive markets result in a fair distribution of income? The simple answer is no! A fair or equitable distribution of income occurs when the wealth and income of society is distributed equally between people. A fair distribution of income would enable all people in society to satisfy their basic needs and wants and enjoy a satisfactory standard of living. This may sound good in theory but it is more difficult to achieve in practice. For example, should people who work harder and longer be able to earn a higher income and therefore be able to consume more goods and services? Should people who earn high incomes have their incomes taxed at a high rate so that this income can be transferred to people who earn less income? While economists can define and measure the efficiency of markets, there is no universally accepted measure of equity. Philosophers have debated the idea of equity for centuries and have still not reached a consensus.

A good example of the tradeoff between efficiency and equity is provided by the pricing of water in Australia. In most capital cities the price of tap water is around \$3 per kilolitre which equates to just 0.3 cent per litre. Compare this to the price of bottled water of around \$3 per litre! An average income earning household spends around 1 per cent of their budget on the water bill. But a low income household spends around 4 times as much on their water bill. The supply of water is an essential household service. But Australia faces a severe shortage of water due to increasing demand and dwindling supplies. In a normal market, the price of water would rise to reflect the increasing scarcity. However, governments keep the price of water below the market clearing price for equity reasons. This results in a severe shortage of water, which means that water restrictions must be imposed to ration the amount available. Are water restrictions efficient? The answer is no! But while increasing the price of water would increase efficiency, it would decrease equity.

When most people think of equity they think of poor people versus rich people. This is known as **vertical equity**. Some people may be rich because they have worked hard, they may have been lucky and won lotto, and/or they may have simply inherited wealth. Most countries attempt to redistribute wealth from the rich to the poor using government income taxes and welfare spending. It can be thought of as the '*Robin Hood*' approach - take from the rich and give to the poor (Robin Hood was a famous defender of the poor in medieval England, also famous for his mastery

with the longbow). But redistributing income does have a limit - it will impact on people's incentive to work if tax rates are set too high. This illustrates the classic tradeoff between efficiency and equity. Increasing efficiency increases the size of the economic pie. Redistributing income and wealth tries to give everyone an equal share of the pie but it may cause the pie to shrink. Which is better - an increasing pie divided into unequal shares, or a smaller pie divided into equal shares?

Vertical equity is based on the idea that those who earn more income should pay a higher rate of tax.

A different approach to vertical equity is to provide everyone with the same opportunity to succeed and earn a high income.

This is known as **horizontal equity**. For example people should be free to choose their own pathway in life, choose how much education they undertake, choose their own occupation and decide how hard they want to work. People should be given the responsibility to make their own decisions, as long as they are lawful. Horizontal equity is synonymous with equal opportunity. In a democratic society, everyone is treated the same and everyone has the same rights. In a free market economy, individuals are allowed to buy and sell assets such as real estate, businesses and shares. An important characteristic of a market economy is the recognition of private property rights. Markets play an important role in allowing people to buy and sell goods and resources. A democratic and free society that protects private property rights has been proven to be the best system for promoting horizontal equity.

In Australia, there is inequality in the distribution of both income and wealth. A person in the top 20 per cent income group has around five times as much income as someone in the bottom 20 per cent. While in terms of wealth, a person in the top 20 per cent has around 70 times more wealth than a person in the bottom 20 per cent. In Australia, the government plays an important role in trying to improve both vertical and horizontal equity. The main tax in Australia is personal income tax. This is a progressive tax where the tax rate rises as income rises. This means that a person earning \$100,000 will pay around \$24,000 in income tax - an average tax rate of 24 per cent. A person earning \$50,000 will pay around \$8,000 in tax which equates to an average tax rate of just 16 per cent.

So the personal income tax system is designed to improve vertical equity - it helps to redistribute income. At the same time, the Government provides payments and financial assistance to people on low or zero income. The primary purpose of Australia's social security system is to alleviate poverty and provide individuals with a minimum adequate standard of living. The most important payments are pensions and allowances such as unemployment benefits. Most of the income received from the social security safety net goes to the bottom 40 per cent income group, many of whom would otherwise live in poverty. Australia is regarded as having one of the most targeted transfer systems amongst advanced economies. Australia redistributes more income to the bottom 20 per cent than virtually every other OECD country. The poorest 20 per cent receive 42 per cent of transfer payments, whilst the richest 20 per cent receive only 3 per cent.

5 Market failure



Learning Objectives

In this chapter you will learn about:

- *the concept of market failure*
- *competitive and imperfect markets*
- *market power and its effect on market efficiency*
- *the role of the Australian Competition and Consumer Commission*
- *the distinction between positive and negative externalities*
- *externalities and their effect on market efficiency*
- *the distinction between public goods and common resources*
- *the free rider effect and the tragedy of the commons*
- *the concept of equity (fairness)*
- *policy options to reduce market failure and promote equity*

Introduction

In the last chapter we studied why free markets are efficient. Efficiency in economics is defined as maximising economic welfare. Market efficiency is achieved by allocating resources so that society maximises net benefits, as measured by total surplus. This is important because resources are scarce and they need to be used in the best possible way rather than being wasted on producing things that society does not necessarily value. The market system uses demand and supply to reflect society's benefits and costs. As long as the market captures all benefits and costs associated with economic activity, then the market is the best method to solve the economic problem, that is, to solve the problem of allocating resources. Price reflects economic scarcity and changes in price give incentives to both consumers and producers when making decisions about consumption and production.

There are a number of instances, however, where the market is not capable of producing the optimal or 'best' outcome for society. In these circumstances we say that the market 'fails'. **Market failure** occurs when resources are not allocated efficiently - in other words total economic surplus is not being maximised. This is an important rationale for government intervention in order to improve market outcomes. The main types of market failure that we will investigate are:

- **market (monopoly) power**
- **externalities**
- **public goods**
- **common property resources**

5.1 Market power

The model of demand and supply that we studied in chapter 2 applies to a competitive market. This is a market that is characterised by a large number of small firms, free entry and exit and very little product differentiation. When one or more of these conditions is not met, then the market is said to be 'imperfect'.

So an imperfect market exists when:

- there are a relatively small number of firms
- firms have market power
- firms use product differentiation
- barriers to entry are used to restrict competition

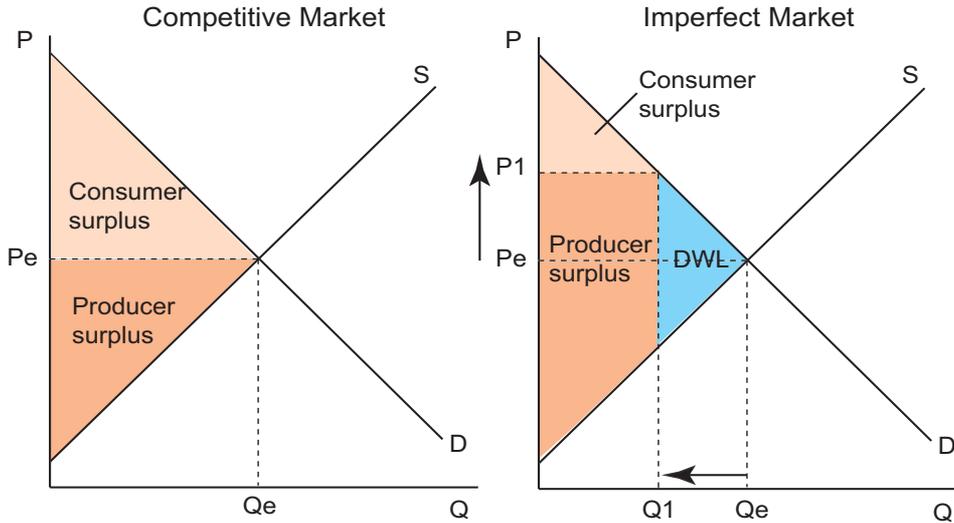
The best examples of imperfect competition are monopoly and oligopoly markets. A monopoly is a market with just one firm (the prefix 'mono' means one). Synergy and Australia Post are government regulated monopolies. An oligopoly is a market with a few large dominant firms (the prefix 'oli' means few). For example, Coles and Woolworths dominate the grocery market in Australia. In imperfect markets firms are said to have market or 'monopoly' power which means that they can set price. In imperfect markets prices are higher because there is less competition.

Barriers to entry are an important feature of imperfect markets. A **barrier to entry** is anything that restricts or blocks the entry of new firms into an industry or market. They may include government regulation and patents, technology barriers, start-up costs and licensing requirements. Existing firms in an industry may own essential raw materials that is not available to potential competitors. A firm may acquire a patent on a certain good which effectively gives it a monopoly. Patents are important in the pharmaceutical industry providing firms with exclusive rights to the production of prescriptive drugs. Firms may be protected from competition by government regulations or an existing firm may use advertising and brand proliferation to make it difficult for new firms to gain a foothold in the industry. High start up costs in the form of extensive capital equipment may also make it difficult for new firms to enter a market. Some examples of entry barriers are listed below:

- Controlling a scarce resource - if a mining company pegged the only diamond mine in the country, it would have sole rights to mine the gems
- A Government licence granting a legal monopoly e.g. Australia Post.
- A technological advantage - e.g. Microsoft has considerable market power because it supplies the operating system used in most computers.
- A patent on an invention gives protection from competition (up to 17 years in Australia).
- Extensive product differentiation, brand proliferation, large advertising budget, controlling retail outlets.
- Economies of scale - only a few firms can compete in the market because of the large setup costs
- Collusive behaviour - when firms agree to share markets, to fix prices or quantities or otherwise seek to reduce competition and/or prevent new firms entering a market

In an imperfect market, such as monopoly or oligopoly, firms can use their market power to 'exploit' the market. A firm has **market power** if it can affect the market price by varying its output. Monopoly and oligopoly firms have substantial market power because they operate in markets with little effective competition. Firms with market power will attempt to profit maximise. Their private interest will not necessarily coincide with society's interests and therefore the socially optimal level of output is unlikely to be produced. This will result in higher prices and reduced output, decreasing economic welfare for society.

Figure 5.1 illustrates the effect of market power on price and quantity. A competitive market will produce where demand equals supply. The equilibrium price (P_e) and quantity (Q_e) is efficient. At the equilibrium, total surplus (the sum of consumer and producer surplus) is maximised. The panel on the right shows the effect of market power. In this case a monopoly reduces output to Q_1 in order to increase price to P_1 . Notice that consumers are now worse off - they pay a higher price and consume a lower quantity. Consumer surplus decreases. The monopoly on the other hand gains - producer surplus (or profit) increases. But society is now worse off because total surplus decreases by the area DWL (the deadweight loss). The deadweight loss

Figure 5.1 Market power

A competitive market is efficient because it maximises total surplus. Market power allows a firm to increase its price by restricting output. Producer surplus increases, but consumers are worse off because they pay more and get less. Total economic surplus decreases - there is a deadweight loss (DWL).

represents the loss in economic welfare because the market has been restricted. This is the classic case against monopoly and why monopolies and oligopolies are criticised for being inefficient. Most countries now have government legislation which promotes a competitive business environment and tries to prevent firms with market power from exploiting the market.

Anti-competitive behaviour

Firms with market power have the incentive to reduce competition - by either reducing price competition or by reducing the number of firms competing in the market. The term **anti-competitive behaviour** refers to any agreements or arrangements between firms that seek to restrain competition and thereby remove the automatic regulation that competitive markets achieve. Competition provides the spur for businesses to improve their performance, develop new products and respond to changing circumstances. Competition offers the promise of lower prices and improved choice for consumers and greater efficiency, higher economic growth and increased employment opportunities. Any agreement between firms in an industry to fix prices, to divide the market, or to prevent the entry of new firms will decrease competition. By engaging in anti-competitive behaviour, firms are able, collectively, to act as a monopoly or oligopoly. Business practices that try to reduce competition will result in market failure and will lead to a deadweight loss. Figure 5.2 summarises some of the main types of anti-competitive behaviour that are used by firms in order to reduce competition.

Figure 5.2 Business practices that reduce competition

<i>Cartel</i>	<i>When firms agree to act or collude together instead of competing with each other - includes both price fixing and market sharing</i>
<i>Collusion</i>	<i>General term describing agreements between firms - either price or market sharing - to reduce competition and increase profits</i>
<i>Market sharing</i>	<i>A market is divided into a series of smaller markets , each supplied by one of the firms, thus reducing competition</i>
<i>Collusive tendering</i>	<i>Firms agree to submit exorbitant tenders which ensure high profits and the sharing of work between the collusive members</i>
<i>Predatory pricing</i>	<i>When a company with substantial market power sets its prices at a sufficiently low level with the purpose of eliminating or substantially damaging a competitor</i>
<i>Resale price maintenance</i>	<i>The supplier sets the price at which a retailer must sell its products. The manufacturer may refuse to sell to any retailer which may resell their products at a discount</i>
<i>Exclusive dealing</i>	<i>When one person trading with another imposes some restrictions on the other's freedom to choose with whom or where they deal</i>
<i>Merger</i>	<i>Two or more firms join together to form one larger firm - prohibited if it substantially reduces competition in the market</i>

Government policy and market power

Market power is prominent in imperfect markets such as monopoly and oligopoly markets. Market power is inefficient because it reduces competition and decreases total surplus. Government policy to address market power includes regulation/deregulation as well as specific legislation. An example of government legislation in Australia that attempts to prevent market power is the Competition and Consumer Act 2010. This Act is administered by the **Australian Competition and Consumer Commission (ACCC)**, and contains rules against anti-competitive conduct to ensure that there is fair and effective competition within Australia. The Act also contains consumer protection rules, known as the Australian Consumer Law, which businesses must abide by in their dealings with consumers. The role of the ACCC is to protect, strengthen and supplement the way competition works in Australian markets and industries to improve the efficiency of the economy and to increase the welfare of Australians. This means that the ACCC tries to ensure that the benefits of increased competition flow through to consumers in the form of lower prices and better service. It does this by prohibiting anti-competitive conduct by firms with market power such as price fixing and collusion. Listed below are some examples of business practices in Australia that are against the law because they limit or prevent competition.

- **Cartels:** A cartel exists when firms agree to act or collude together instead of competing with each other. Typical cartel behaviour includes price fixing and market sharing.
- **Misuse of market power:** A business that has a substantial degree of power in a market (e.g. a monopolist) is prohibited from taking advantage of that power for the purpose of eliminating or substantially damaging a competitor or preventing the entry of a firm into any market.
- **Exclusive dealing:** this occurs when one firm trading with another imposes some restrictions on the other's freedom to choose with whom, in what, or where they deal. Most types of exclusive dealing are against the law only when they substantially lessen competition.
- **Resale price maintenance:** Suppliers, manufacturers and wholesalers are prohibited from specifying a minimum price below which goods or services may not be resold or advertised for resale. A supplier may recommend a resale price for goods, provided that it is a recommended price only.
- **Predatory pricing:** this occurs when a company with substantial market power sets its prices at a sufficiently low level with the purpose of eliminating or substantially damaging a competitor or preventing the entry of a competitor into that or any other market.
- **Collective boycotts:** This occurs when a group of competitors agree not to acquire goods or services from, or not to supply goods or services to, a business with whom the group is negotiating, unless the business accepts the terms and conditions offered by the group.
- **Mergers or acquisitions:** Mergers may be deemed to be in the public interest if they lead to benefits for consumers. However, if they have the effect of substantially lessening competition in a market then they are prohibited.

The Competition and Consumer Act provides for heavy penalties where firms where firms have engaged in anti-competitive behaviour. In 2008, for example, Visy was fined \$36 million by the Federal Court for its role in the cardboard packaging cartel which overcharged thousands of firms and millions of consumers. In 2016, Colgate-Palmolive was ordered to pay an \$18 million fine for colluding with rival companies to fix the price of detergents in Australian supermarkets.

Governments need to be careful when using regulation to achieve certain social objectives that they don't reduce the level of competition in an industry. The types of regulations that restrict competition are those that:

- limit the number or types of businesses
- limit the ability of businesses to compete
- reduce the incentive for businesses to compete
- limit the choices and information available to consumers.

The taxi market is a good example where government regulation led to reduced competition, high prices and relatively poor service. In this case, the answer is deregulation - remove the unnecessary restrictions on the market and allow increased competition. In certain cases, such as the sale of firearms and explosives, then regulation is necessary to protect the public.

Review Quiz

1. *When does market failure occur?*
2. *What are the four characteristics of an imperfect market?*
3. *Provide three examples of an entry barrier.*
4. *What is market power?*
5. *Why is a monopoly inefficient?*
6. *What is the role of the ACCC?*

5.2 Externalities

The market reflects the buying and selling intentions of consumers and producers. Demand reflects the private benefits that consumers receive while supply reflects the private costs of production. There are many circumstances though, when the production (or consumption) of a good may create external costs and/or external benefits. These are side effects of economic activity and are referred to as **externalities**. Consider the following examples - which of these would be considered an externality?

1. *A person smokes a cigarette in a crowded room*
2. *Loud music from a nearby concert disturbs your sleep*
3. *A factory discharges toxic chemicals into a river*
4. *Your neighbour maintains a beautiful garden*
5. *You visit your doctor to get a flu vaccine*
6. *A hurricane destroys fruit and vegetable crops*

The first five are examples of an externality, but not the last example. Examples 1, 2 and 3 are all negative externalities. In each of these cases there is an external cost imposed on someone else. Examples 4 and 5 are positive externalities because someone receives a free external benefit. In the case of example 4, you receive the external benefit from your neighbour. In example 5, your friends will receive an external benefit because they will be protected from getting the flu from you. Example 6 is not an externality because the effects of the hurricane will be captured by the market in terms of higher prices. Externalities are unintended consequences of economic activity. It means that when they exist, the market outcome will not be efficient. The market will fail to set the 'correct' price and fail to produce the socially optimal quantity.

Negative externalities

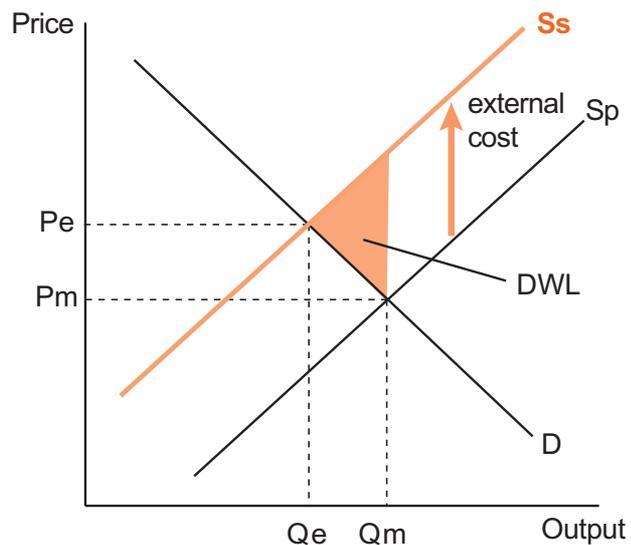
There are many examples of negative externalities created from both the consumption and production of goods and services. Driving cars increases smog and air pollution and contributes to congestion increasing travel time; lawn mowers and chain saws create noise pollution; people smoking cigarettes affect the health of non-smokers; using fossil fuels contributes to global warming and climate change. These are all examples of activities that create negative side effects. When economic actions from either production or consumption create an external cost, it is referred to as a **negative externality** and it will cause the market quantity to be greater than the optimal quantity and will cause the market price to be less than the optimal price.

Consider the example of using a freeway at peak time to drive to and from work - a private decision which thousands of motorists make each day. They make their decision by weighing up the costs and benefits that accrue to them as individuals. These would include the costs of petrol, the time taken for the trip, the convenience factor of having their car at work, or perhaps to avoid the need to walk from the bus station to their office. But the economic action of driving along the freeway imposes costs on other motorists. The extra car adds to the congestion experienced by all other cars on the freeway. The increased congestion adversely affects other motorists - it imposes an external cost or externality on other drivers.

Pollution is a classic example of a negative externality. A factory that emits pollutants into the atmosphere is likely to impose an external cost on those people who are affected by the pollutants. The pollution may adversely affect the health of people living in the area. Why do firms pollute the environment? Because it is free - no one owns it. If the firm was forced to install air filters to eliminate the pollutants, then there would be no external cost and there would be no market failure. The problem

Figure 5.3 A negative externality

A negative externality such as pollution results in an external cost which causes a divergence between private costs (S_p) and social costs (S_s). The market equilibrium is where $D = S_p$ with price P_m and quantity Q_m . The market fails because it overproduces - the efficient price and quantity considering external costs, is P_e and Q_e where $D = S_s$.



is that the atmosphere is free to use and so the factory pollutes. A negative externality can be analysed using the demand and supply framework introduced in Chapter 2. Figure 5.3 shows a typical negative externality such as air pollution associated with a factory. The demand curve D in Figure 5.3 represents the benefits of consumption, while the supply curve S_p represents the private costs of production. If only private costs are taken into account, the market (equilibrium) quantity is Q_m , and the market price is P_m . But the private market fails to recognise the external costs of the pollution. To determine the efficient or optimal output we need to consider all costs of production - both private and external.

Social cost is equal to private costs plus external costs

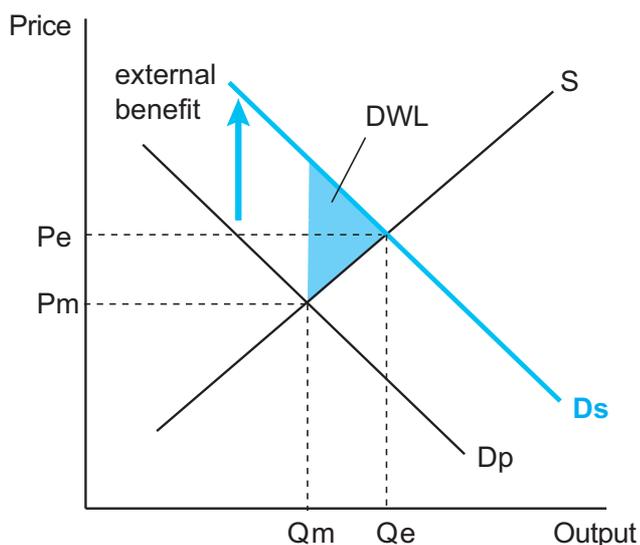
In Figure 5.3, the social supply curve is S_s . The 'correct' or efficient price and quantity is where the S_s curve intersects with the demand curve - price should be P_e and quantity should be Q_e . The market is said to 'fail' in the presence of a negative externality because there is overproduction - the market quantity exceeds the efficient or optimal quantity. This means that there is a deadweight loss - a decrease in total surplus. If producers were forced to pay for the external costs, then there would be no externality and no market failure.

Positive externalities

Externalities are not always bad! Positive externalities create an external benefit for third parties. How many health clubs or gyms are in your area? The membership fee gives the consumer the right to use the equipment and get expert advice to improve their fitness and general well-being. The first and second parties in this market are the buyer and seller. A number of third or external parties also benefit from the private transaction - for example, the member's employer. A healthy, fit worker is

Figure 5.4 A positive externality

A positive externality such as education results in an external benefit which causes a divergence between private benefits (D_p) and social benefits (D_s). The market equilibrium is where $D_p = S$ with price P_m and quantity Q_m . The market fails because it underproduces - the efficient price and quantity, considering external benefits, is P_e and Q_e where $D_s = S$.



more likely to be a productive worker. If this is the case, some of the benefits of the transaction have 'spilled over' to the third party. A student entering university in Australia pays several thousand dollars in HECS (Higher education contribution scheme) fees. These can be paid up-front or deferred until a threshold income is reached. The private benefit of further education is the extra salary which the student will receive. But society also gains in the long run, because it has a more skilled and productive workforce. Society has thus enjoyed an external benefit from the individual's decision to further their education.

Figure 5.4 analyses a typical positive externality such as education. The supply curve S in Figure 5.4 represents the costs of education, while the demand curve D_p represents the private benefits of consuming education services. If only private benefits are taken into account, the market quantity is Q_m , and the market price is P_m . But the private market fails to recognise the external benefits of education to society. To determine the optimal or efficient output we need to consider all benefits of consumption - private and external.

Social benefit is equal to private benefits plus external benefits.

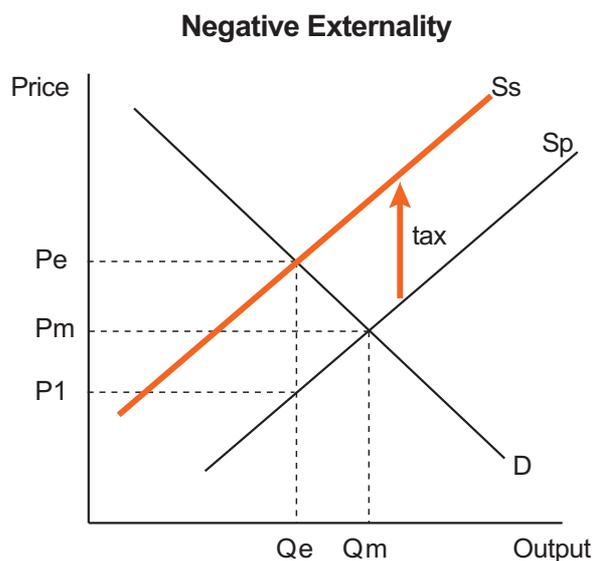
In Figure 5.4, the social demand curve is D_s . The 'correct' or efficient price and quantity is where the D_s curve intersects with the supply curve - price should be P_e and quantity should be Q_e . The market is said to 'fail' in the presence of a positive externality because there is underproduction - the market quantity is less than the efficient or optimal quantity. This means that there is a deadweight loss - a decrease in total surplus. If the market were forced to consider the external benefits, then there would be no market failure.

Why do externalities occur? In the case of environmental externalities such as pollution, the problem is the lack of **property rights**. Who owns the atmosphere or the oceans? Property rights define the ownership and use of a resource. Many environmental resources are open access resources - they are not privately owned. These types of resources do not have a price to restrict their use like a private good. Free goods such as the environment will be overused and exploited. People can use these resources without paying for them. There is no incentive to use these resources in a socially optimal way.

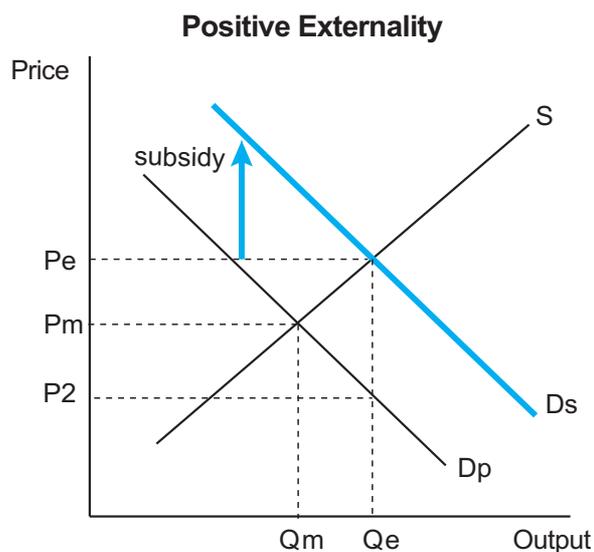
Government policy and externalities

When externalities exist, the market outcome will not be efficient - the optimal quantity will not be produced and the price charged may not reflect the true value of the resources used in production. Governments have a clear role in the presence of externalities. They should take action to reduce the production of goods causing negative externalities, and increase the consumption of goods creating positive externalities. Government policy needs to 'internalise' the externality - force the market to recognise and include the external cost or external benefit in the market price.

Figure 5.5 illustrates how governments can use market based policies to correct for externalities. In the case of a negative externality, a tax should be placed on the

Figure 5.5 Internalising externalities

To internalise a negative externality, the government can impose a tax on producers equal to the external cost. The tax is equal to $PeP1$. The tax forces the polluter to pay. The tax shifts the firm's private supply curve (Sp) to the social supply curve (Ss). Price is increased to Pe and quantity is decreased to Qe .



To internalise a positive externality, the government can pay a subsidy to consumers equal to the external benefit. The subsidy is equal to $PeP2$. The subsidy shifts the consumer's private demand curve (Dp) to the social demand curve (Ds). Producers receive Pe but consumers only pay $P2$ (after the subsidy) while quantity increases to Qe .

producer to reduce output, while in the case of a positive externality a subsidy should be used to increase output. The top diagram shows a negative production externality. A firm in producing its output pollutes the environment. The government could place a pollution tax on the firm equal to its external cost - the difference between the firm's private cost (Sp) and society's social cost (Ss). The tax increases the firm's private costs, which shifts the private supply curve (Sp) to coincide with the social supply curve (Ss). The tax increases the price of the good from Pm to Pe , while output is decreased from Qm to Qe . The tax has corrected the market failure - firms are being forced to pay for their external costs. Taxes are an excellent example of the

'polluter pays' principle. Pollution taxes provide firms with incentives to reduce their pollution in order to reduce their tax bill. Taxes also encourage firms to adopt cleaner technology.

The bottom diagram shows a positive consumption externality such as education. Education creates a large external benefit - the social demand curve (D_s) lies above the private demand curve (D_p). The market equilibrium is at P_m and Q_m , but this does not take into account the external benefits. In this case, the government could pay a subsidy to the consumer equal to the external benefit (PeP_2). The payment of the subsidy would shift the market from the equilibrium price and quantity of P_m and Q_m to the efficient combination of P_e and Q_e . The subsidy has the effect of reducing the price paid by consumers and increasing consumption. In Australia, the government not only subsidises the cost of education and health services but also provides free public schools and hospitals.

Review Quiz

1. Why are externalities referred to as 'spillover effects'?
2. Give an example of a negative externality.
3. Give an example of a positive externality.
4. Why does a negative externality create a deadweight loss?
5. Why does a positive externality create a deadweight loss?

5.3 Public goods and common resources

The price system normally enables markets to provide the efficient quantity of a good because prices send the right signals to both consumers and producers. The market ensures that people can buy essential goods such as milk, bread, meat and vegetables. If there is a shortage of a particular good, its price will rise which will signal to consumers to either lower consumption or look for a substitute. At the same time, the rising price will be an incentive to producers to increase production. We don't need a special government department for milk or bread to make sure that enough bottles of milk or loaves of bread are being produced. The market automatically does this.

However, there are some goods and services in the economy that do not have prices, which means that these goods will not usually be produced by markets. To examine these types of goods we need a way to separate the goods that have prices and those that do not. A useful way to classify the different goods in the economy is to use two criteria:

- Whether a good is **rival** in consumption – does the consumption by one person reduce the supply available to other users?
- Whether a good is **excludable** – is it possible to exclude a non-payer from consuming the good or service?

Using these criteria it is possible to identify four different types of goods:

- **Private goods**
- **Club goods**
- **Common resources**
- **Public goods**

These four different types are shown in figure 5.6. Markets can profitably supply private goods and club goods, but they cannot supply public goods or common property goods. The reason is that the latter two goods do not have a price - they are non-excludable. These goods are subject to **free riders** - people who can consume the goods without paying for them.

Private goods

The term **private goods** describes most of the goods and services purchased by households. Private goods have two important characteristics - they are rival in consumption, and they are excludable from non-payers. A good is said to be rival in consumption if one person's consumption decreases the consumption of others. A can of soft drink consumed by one person cannot be consumed by someone else. When you buy a new car, the stock of cars available to other consumers is reduced by one. When you purchase a good you are given a receipt - this is your property right to the good which gives you legal ownership.

Private goods are also characterised by the **exclusion principle**. This means that those consumers who are willing and able to purchase a product gain exclusive rights of ownership and the benefits that can be derived from that ownership. Consumers who are not able or willing to pay the price are excluded from using the

Figure 5.6 Classifying goods

	<i>Rival</i>	<i>Nonrival</i>	
Excludable	Private Good e.g. computer mobile phone clothing	Club Good e.g. Netflix Spotify gymnasium	<p><i>A useful way to classify types of goods in the economy is to ask two questions:</i></p> <p><i>(1) whether a good is rival in consumption – does the consumption by one person reduce the supply available to other users?</i></p> <p><i>and (2) whether a good is excludable – is it possible to exclude a non-payer from consuming the good or service?</i></p>
Nonexcludable	Common Resource e.g. forests fish in the ocean the atmosphere	Public Good e.g. lighthouse national park national defence	

good. Property rights for private goods are thus easily identified and enforced: non-paying customers can be prevented from consuming private goods. The free market will usually provide adequate amounts of private goods because consumers are willing to pay for their use, creating a profit incentive for producers.

Club goods

Club goods (also known as quasi-public goods) are nonrival in consumption and excludable. Nonrival means that these goods can be consumed collectively by many people at the same time. An example would be streaming music from Spotify or iTunes or watching a movie in a cinema. As long as the cinema has spare seats, an extra person can enter the cinema and consume the movie without affecting the consumption of others. Excludable means that price can be used to prevent or exclude people who do not pay for the good or service. The cinema can charge a price to watch the movie - a consumer must present a ticket to gain entry. Netflix and Spotify are other good examples of club goods. Millions of people can consume these streaming services at the same time (nonrival consumption) but they must pay a subscription fee to receive the transmission (excludable). These goods are referred to as club goods because they can be consumed collectively by a large number of people. Gymnasiums and sports clubs are also good examples.

Public goods

The two types of goods that involve market failure are public goods and common property goods. **Public goods** are nonrival in consumption, and nonexcludable - free

National defence is a public good, but public transport and public health are not. Explain why.

riders cannot be excluded. A good is non-rival if its consumption by one person does not lower the potential consumption of others. The air you breathe is nonrival - many people can all breathe air at the same time without reducing the amount of air for others. The use of a footpath is also non-rival - if another person decides to walk on the path, he or she does not diminish

the ability of others to enjoy walking on that path. A fireworks display and a free-to-air television broadcast are also non-rival goods.

The other essential characteristic of public goods is that the exclusion principle does not apply to them. It is impossible or extremely difficult to prevent a non-paying customer from consuming a public good - 'if made available to one, they must be made available to all'. It is not possible to exclude someone from enjoying a fireworks display over the city skyline or from receiving broadcast television or radio. An excellent example of a public good is a lighthouse. Consumption is non-rival - a ship using the lighthouse as a navigation aid does not prevent other ships from seeing the light. The service is non-excludable - it would not be possible to switch the light off if a passing ship had not paid its fee! Other examples of public goods include:

- suburban roads
- national defence
- national parks
- broadcast radio and free to air television

Radio and free to air television are examples of public goods that are provided by private firms. Both are nonrival in consumption and both are nonexcludable - the services are free. The cost for these services is paid for by advertising. Cable TV, on the other hand, is not a public good because, while being non-rival in consumption, it can be excluded from consumers who don't pay.

Many public goods are essential for our welfare as a society, and are generally provided by the government and financed by general taxation revenue. Private enterprise has no incentive to provide public goods because they cannot be priced and sold in a market, and hence they cannot be profitable. It would be virtually impossible to exclude non-paying customers from consuming these goods. These non-paying customers are referred to as **free riders** - consumers who enjoy the benefits of consumption without paying for the cost of provision. Many people classify public education, public health and public transport as public goods, but this is incorrect. These are not public goods, even though they are supplied by the government. Each of these goods is excludable - they can be priced. While these goods can be consumed collectively they can be subject to congestion - overcrowding on public transport and shortage of hospital beds. Governments supply these goods because they have large external benefits for society. These types of goods are sometimes referred to as **'merit goods'**.

Public goods are said to suffer from the 'free rider' problem - people who can consume without paying because they cannot be excluded.

Education and health are both supplied (at a price) in private markets. But if their supply was left completely to the free market, it is likely that there would be significant under-consumption of these goods. This is because the value some individuals place on these services is less than the value society places on them. Not everyone can afford private education or could pay expensive hospital and medical bills. The substantial social benefits associated with these goods often results in the government intervening to supply them at a heavily subsidised price to encourage greater community consumption.

Common resources

Common resources share the non-excludable characteristic of public goods but are rival in consumption. The ocean and the atmosphere are good examples. Ownership of these goods is universal - there are no clearly defined private property rights. Common resources, similar to public goods, cannot be priced. If you go fishing and catch a nice pink snapper, does it have a price tag attached to its tail? Do you have to throw money into the ocean to buy the fish? Of course not! The fish have no price, they are free. This encourages people to consume as many as they can. When common resources like fish in the ocean are consumed, a negative externality is imposed on other consumers because the quantity has been depleted. The number of fish in the ocean is rival, so over-fishing will drastically reduce the stock. People pursue their own self interest to the detriment of others. This is commonly referred to as the **'tragedy of the commons'** after an article written by Garrett Hardin (a biologist) in 1968.

Other examples of common resources include endangered species, such as elephants and tigers, and congested freeways and highways. Each of these suffers from the tragedy of the commons. Fish and wildlife are both non-excludable and rival - this is why the free market fails to preserve fish stocks and fails to prevent many

The 'tragedy of the commons' is an economic problem that results in overconsumption and the depletion of a resource that is mutually shared.

forms of wildlife from becoming extinct. Most freeways and highways are free to use by any motorist - there are usually no tolls. At peak times, the freeways become congested or 'rival'. As more cars enter the freeway, the congestion imposes an external cost on all other motorists on the freeway. Common resources require the government to act as protector and regulator, to manage and help control

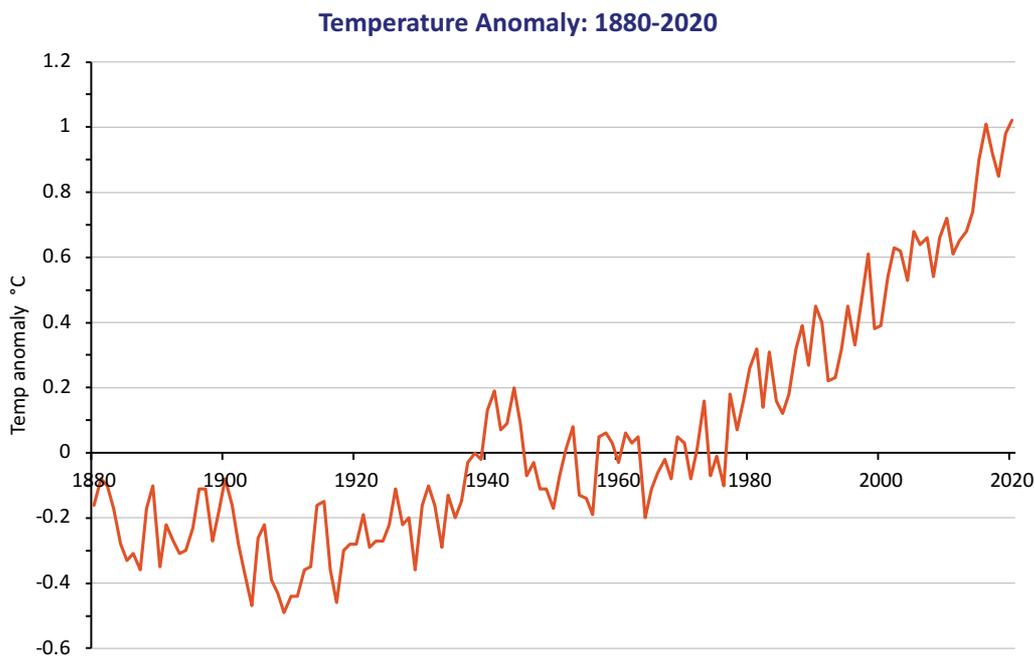
the use and overconsumption of these goods. In the case of fishing, most states in Australia set a restricted fishing season and bag limits for recreational fishing and quotas and licences for commercial fishing. In this way the fish stock is managed so that it can be replenished over time. In some cities, tolls or electronic road pricing is used to put a price on the use of freeways, especially at peak times, to reduce the amount of congestion.

Review Quiz

- 1. When is a good non-rival in consumption? Give an example.***
- 2. When is a good non-excludable? Give an example.***
- 3. What is a public good? Give an example.***
- 4. Define consumer surplus.***
- 5. What is a common resource? Give an example.***
- 6. Why do public goods and common resources suffer from market failure?***

5.4 Case studies in market failure

Global warming leading to climate change has been called the greatest market failure of all time! Global warming results from the burning of fossil fuels such as coal, oil and natural gas. These energy resources supply around 80 per cent of the world's energy. Most of these fossil fuels are used to produce electricity for industrial and household use and in the case of oil, to produce petrol for the transport sector. Burning these fuels produces carbon dioxide which collects in the atmosphere and contributes to the enhanced 'greenhouse effect'. Carbon dioxide (CO₂) and other greenhouse gases such as methane and nitrous oxide, act as a blanket which traps outgoing radiation and warms the atmosphere. This warming effect is crucial for life - it prevents the planet from freezing. The natural greenhouse effect keeps the planet at an average temperature of around 15°C instead of -15°C. So what is the problem? The IPCC (Intergovernmental Panel on Climate Change) has concluded that human activity is increasing the concentration of greenhouse gases (especially CO₂) in the atmosphere and that this is adding to the natural greenhouse effect.

Figure 5.7 Global temperatures

Over the past century global temperatures have increased by around 1.5° Celsius. Most of the increase has occurred since 1970. This increase has been linked to the increasing concentration of greenhouse gases in the atmosphere. The burning of fossil fuels and deforestation are the main factors causing the increase in CO₂ concentration.

Since the industrial revolution, the concentration of carbon dioxide (measured as parts per million by volume) in the atmosphere has increased by nearly 50 per cent and is considered by climate scientists to be the main reason why the average temperature has increased by around 1.5 degrees Celsius over the past 100 years. The problem with carbon dioxide is that it lasts in the atmosphere for up to a century - it does not dissipate quickly. It is predicted that if the concentration of greenhouse gases continues to increase, then the average temperature could rise by 2 - 3 degrees by 2100! This could lead to dramatic changes in climate, the melting of the polar ice caps and subsequent rise in the sea level. Figure 5.7 shows the change in global temperature since 1880. The vertical axis measures the temperature difference (anomaly) with respect to the average temperature for the 1950-1980 base period. The graph shows a period of global cooling between 1880 and 1940 and then a period of distinct warming from 1975 to the present.

Year	CO ₂ conc (ppm)
1960	317
1970	326
1980	339
1990	354
2000	370
2010	390
2021	414

Why is climate change regarded as the greatest market failure of all time? Because it involves global negative externalities in both production and consumption and it involves the overuse of a common resource - the atmosphere.

Every country in the world produces carbon emissions. Industry produces carbon emissions and so do households. The emissions impose external costs on everyone, especially future generations. To solve the problem of global warming will require every country to reduce their carbon emissions, to switch to a cleaner technology or to switch to a non-carbon based energy such as solar power. A solution favoured by economists is a carbon tax. This would increase the price of using fossil fuels and provide incentives for both producers and consumers to seek non-carbon alternatives.

The **Covid pandemic** is the biggest health and economic crisis to hit the global economy in over a century. The pandemic has affected every country with over 250 million contracting the virus and over 5 million people dying. The pandemic resulted in a global recession with significant falls in national income accompanied by many job losses and business closures. What aspects of the pandemic are related to market failure? With infectious diseases like Covid-19, how one person behaves necessarily affects other people's wellbeing - this is the subject of externalities. If someone who has the virus passes it on to someone else, then they have imposed an external cost on that person - they have created a negative externality. The lack of social distancing by one person creates a negative externality because there is a higher risk of infection for all. Economic theory suggests that the government should impose penalties on those who create a negative externality as an incentive to change their behaviour. Examples would include a fine for not wearing a face mask in public or restrictions on participating in community events such as a concert or a sporting event.

One of the classic examples of a positive externality is becoming vaccinated or immunised against an infectious disease. A person who receives the Covid vaccine not only obtains a private benefit but they also create an external benefit for others, since they reduce the risk of infection. This is why the Covid vaccine has been made available to every citizen in the world for free! The social benefit of the vaccine is far greater than the cost.

6 Macroeconomic activity



Learning objectives

In this chapter, you will learn about:

- *the concept of macroeconomics and its relevance*
- *the distinction between macroeconomics and microeconomics*
- *the circular flow of income model*
- *the concepts of total spending, total output and total income*
- *the concepts of equilibrium, leakages and injections*
- *the effect of changes in leakages and injections on the level of equilibrium*
- *Gross domestic product (GDP)*
- *the components of aggregate expenditure*
- *factors affecting each of the components of aggregate expenditure*

6.1 Introduction to macroeconomics

Economics is often thought of as having two ‘branches’ – microeconomics and macroeconomics. The prefix ‘micro’ refers to parts of the economy. Microeconomics studies the behaviour of individual households and firms. It addresses questions such as why consumers usually buy more goods and services when prices are low;

Macroeconomics focuses on the performance of the whole economy - it is concerned with total production, income and employment.

how producers can make the most efficient use of resources; how the price of a commodity such as oil is influenced by changes in demand and supply; and why markets are considered to be efficient. You will remember these concepts from earlier chapters. Macroeconomics, on the other hand, studies the economy as a whole. The prefix ‘macro’ means large – macroeconomics is concerned with the big picture of the economy. Macroeconomics focuses on why the economy grows

and why economic activity fluctuates over time. It is concerned with the business cycle, economic growth, inflation, unemployment, and government policies developed in response to changes in these variables.

In the study of macroeconomics, economists:

- collect and analyse information and statistics, especially about spending and production patterns, to understand current trends in the economy.
- apply economic models and theories that describe and explain those trends.
- propose policy measures to improve the performance of the economy in both the short and the long term.

Why study macroeconomics – is it actually relevant to us?

As senior secondary students, you will shortly be making decisions about your future education and career path. You have probably wondered how you will ‘fit’ into the economy (what job or career you want; what business you might start; how much you could earn, and so on).

On any day of the week, the media publishes articles about:

- current events in the national and world economy
- trends in growth, inflation and unemployment rates
- economic policies used by governments in Australia and elsewhere

Because every one of us is a participant in the economy, it’s useful to develop ‘economic literacy’ – the ability to understand economic events and how they might affect our households, jobs and businesses. An understanding of these concepts is important because they can affect the decisions we make from day to day. Would you borrow money to buy a car or a computer if news reports said that interest rates were rising? Would you buy new equipment for your business if consumer spending was falling? Should one of your family members quit their part-time job when job vacancies were falling?

Economic literacy also helps us to think critically about what people are saying and writing about the economy. Is it good or bad for the Australian dollar to be falling against the Euro? Is a rise in the participation rate significant? Imagine a news item on radio said the Australian government has forecast a Budget deficit. How will a deficit impact on us as consumers, workers and business people? What point of view has the news report taken? Is it reporting facts or opinions?

6.2 The circular flow of income model

A model is a simplified view of reality that omits many of the complications of the real world in order to provide us with a clear picture of how something works. A street map on your smartphone is a model – it provides a diagrammatic view of an area of land. The maps don't show high levels of detail like individual houses or vegetation, but they provide us with a representation of what we need to know to find our way through the suburbs.

The **circular flow of income** is a macroeconomic model that describes the flows of resources, goods and services, and income and expenditure, between the parts of the economy. The model divides the economy into its key sectors – households, firms, the financial sector, the government and the overseas sector. To build the circular flow model, we first describe the nature of the household and firms sectors, and the relationships between them. We then introduce other sectors.

Households and firms

The economy is a continuous flow of money, goods, services and productive resources between people that make them, and people that want to buy them. The circular flow diagram is a model of this activity. The basic model in figure 6.1 is based on a number of simplifying assumptions that allow us to develop our 'map' of the economy:

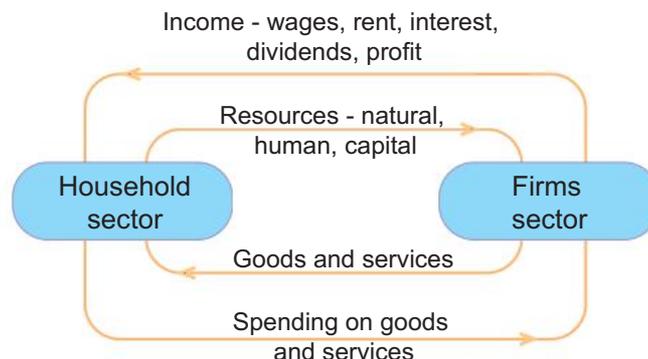
- there are only two sectors in the economy – households and firms
- households are the owners of the productive resources (land, labour, capital and enterprise); and the buyers of final goods and services.
- firms are the employers of resources, and produce all the goods and services for the economy
- households spend all their income, so there is no saving
- there is no government sector
- there is no overseas trade

Given these assumptions, figure 6.1 describes the pattern of exchange that would occur in order for people to satisfy their wants and needs in our economy. The model has two flows – goods, services and resources are **real** flows, whereas spending and income are **money** flows. In the **factor market** (the pair of flows at the top of the diagram), firms hire resources (natural, human and capital) owned by households, in return for which they provide various types of income as payment. Most households receive the majority of their income in the form of wages or salaries; but some earn rent in return for productive land they hire to producers; some receive dividends as

Figure 6.1 *Circular flow - households and firms*

In the factor market, households receive income in the form of wages, rent, interest, dividends and profits from the resources they supply to firms for use in the production process.

In the product market, households spend their income in exchange for goods and services produced by the firms sector.



a return for the money capital they have invested in companies; some earn interest because they have lent surplus money to borrowers; and others are entitled to profits in return for their managerial and entrepreneurial skills (enterprise).

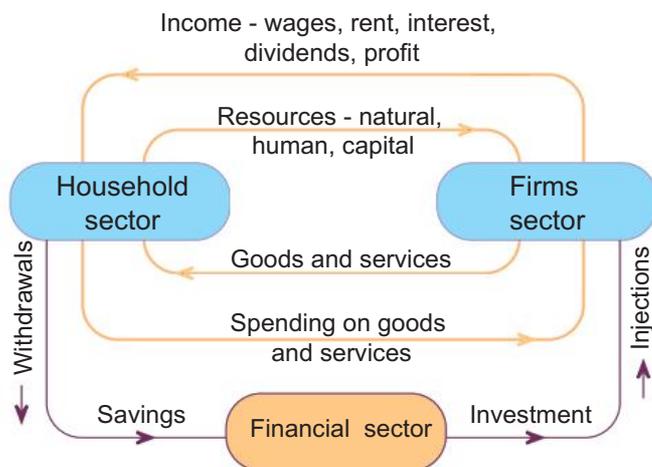
In the **product market** (the lower portion of the diagram), households and business firms spend the income they have earned to buy goods and services produced by business firms.

The model reminds us that people in modern economies are **interdependent** – we all depend on one another to provide the goods and services that satisfy our wants and needs. Very few people in the modern economy can claim to be self-sufficient. Very few even try! It is a much better use of scarce resources, both for individuals and groups, to ‘specialise and exchange’.

Saving and investment

Now let’s relax the assumption that households spend all of their income on goods and services. **Saving** is the portion of household income not spent on goods and services for current consumption. Households deposit their surplus funds into financial institutions such as banks, credit unions and superannuation funds. These financial institutions make up what is called the **capital market** or financial sector, as shown in figure 6.2. Saving represents a **leakage** from the circular flow because it reduces the flow of money and goods between households and firms.

Investment (in the economics sense) is defined as expenditure on goods and services which are not intended for current consumption. Investment includes spending by firms on production equipment and machinery, and spending on buildings and factories. Investment in capital goods now leads to increased production of final goods and services for consumers in the future. Investment is an **injection** that offsets the savings leakage in the circular flow.

Figure 6.2 Circular flow - the capital market

Saving is the proportion of income not spent on consumption, and is a leakage from the flow of current income. Investment is firms spending on capital equipment that will be used to produce goods and services in the future. Investment is an injection of funds into the circular flow.

The model shows how the capital market is the intermediary between savers and investors – it pools the surplus funds of savers to create a pool of funds for firms to spend on investment.

The government sector

The government plays a significant role in the economy as the producer of goods and services such as education, health, welfare services, and defence. To produce these services, the government purchases resources in the factor market. In Australia, the three levels of government together employ about 18 per cent of the workforce (2 million people). Government is also a consumer, as it buys goods and services from businesses. The government has also become responsible for the provision of social welfare (such as pensions, the job search allowance and child care allowance). In economics, these are called **transfer payments** because they are provided without exchange of goods or services in return. Government also regulates many aspects of economic activity so that commerce runs smoothly and equitably.

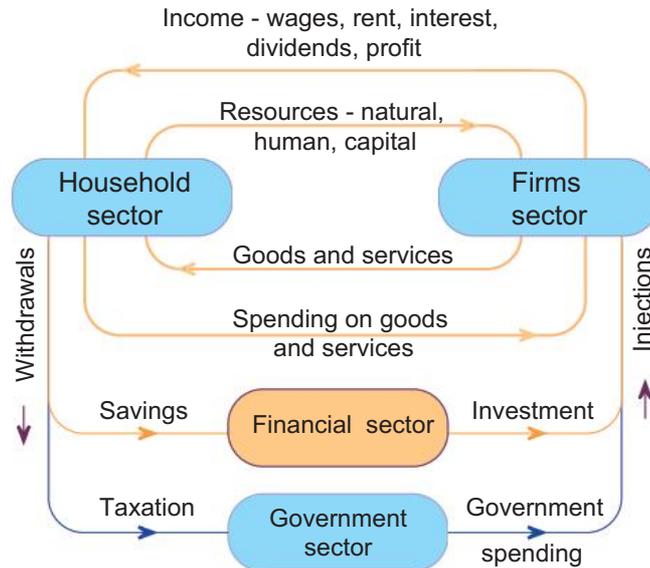
Figure 6.3 illustrates the role of the government in the circular flow of income – households pay some of their income to the government (the **taxation** leakage) which is returned to the circular flow through the **government expenditure** injection. Many of the collective goods and services our community needs are provided by the government sector, which raises most of its revenue from taxation. Wages and salaries attract income tax, business firms pay tax on their profits, and certain types of consumption expenditure attract taxes, such as sales and excise duties and Goods and Services Tax (GST). Like savings, taxation is a leakage from the money flows between households and firms.

Government spending is the corresponding injection into the flow of income. Government spending can also be classified as **current expenditure** (spending on current goods and services such as wages and salaries, fuel, power and stationery) or **capital expenditure** (spending on capital or investment goods which are sometimes called public or social **infrastructure** – schools, roads, railways and hospitals).

Figure 6.3 Circular flow - adding the government sector

The government sector collects taxation from households and spends those funds to provide goods and services for collective consumption, or to make transfer payments such as social security.

Like savings, taxation is a leakage from the flow of income between households and firms. Government spending is the injection by which funds are returned to the flow.



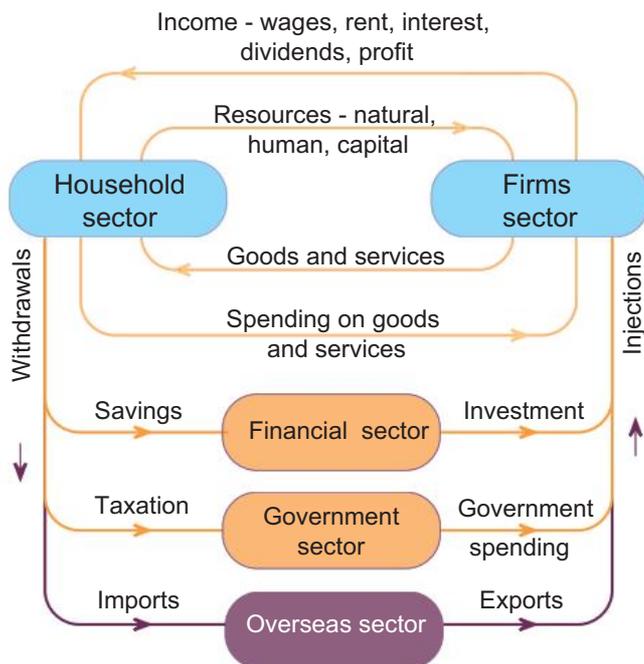
The overseas sector

All households spend some of their income on goods and services imported from overseas. Similarly, people in other countries purchase Australian-made goods and services. Hence, we should relax the assumption that the economy is closed. An **open economy** is an important contributor to our economic well-being because trade allows us to buy items we cannot produce ourselves, and foreigners to buy products that they cannot produce. For example, China and India buy Australian iron ore; Japan buys natural gas; students from Asia and Africa purchase Australian education, and Australians buy machinery, electrical equipment and vehicles from overseas nations. The international sector is also a source of investment funds, both in to and out of Australia. Figure 6.4 adds the overseas sector to our model. Imports are a leakage from the circular flow, and exports are an injection. A transaction is classified as an **import** when the money flows from Australia to overseas. In the case of **exports**, the flow of money is from overseas to Australia.

The full circular flow model

As we have relaxed our original assumptions, our model has become progressively more realistic. Aside from the real and money flows that constitute the flow between households and firms, the full model includes:

- a capital market (financial sector) that exists to match the needs of households with surplus income and the firms that wish to draw on those funds for investment
- the government sector that provides many community needs, financed by taxation

Figure 6.4 Circular flow - the full model

The addition of the overseas sector completes the full circular flow model. Flows between Australia and overseas include imports and exports of goods and services, and financial transactions.

Imports are a leakage, and reduce the flow of income in Australia, whilst exports are an injection which adds to the flow.

For overall equilibrium:

$$S+T+M = I+G+X$$

That is, the sum of the leakages from the flow equal the sum of injections entering the flow.

- trade with other countries, which provides for the needs we cannot satisfy ourselves in return for domestically produced goods and services that are surplus to our needs

Figure 6.4 also serves as the complete circular flow of income model. It gives us an overview of the **interdependence** between the major sectors of the economy. The model helps us understand the relevance of macroeconomic events to everyone in the economy. Whenever levels of spending are changing, the size of the real and money flows shown in the circular flow must also change. If there was an increase in investment in capital equipment by the business sector, everyone in the economy can expect to benefit because money and real flows increase. A rise in taxes, on the other hand, would reduce the amount of money that people have to spend, probably leading to reduced production, which will then lead to a fall in earned income. A rise in exports (for example rising sales of iron ore to China and India) would bring more money into the circular flow, and increase income earned. These types of changes are examined in more detail in the next section.

6.3 Macroeconomic equilibrium

An important conclusion to be drawn from the simple version of the circular flow model (see figure 6.1) is that 'one man's spending is another man's income'. In the circular flow, the value of output produced by firms must equal the value of income paid to resource owners, which must in turn equal the value of spending by households to produce the output.

This equality can be expressed as an identity:

$$\Sigma O = \Sigma Y = \Sigma E$$

where O = output, Y = income and E = expenditure, and the Greek letter sigma (Σ) means 'the sum of'. The identity thus says that 'the sum of all output equals the sum of all income equals the sum of all spending in the economy.' As long as the assumptions mentioned earlier hold, all income is spent and all output is consumed. In economic terminology, this is known as **equilibrium**. When equilibrium occurs, there is no tendency for the level of income in the economy to change. Equilibrium means that the system (in this case the macroeconomic system) is 'in balance'.

In introducing the capital market into the circular flow model, we said that households save part of their income which the financial institutions pool before lending the money to business wishing to invest in capital equipment. The capital market is in equilibrium when savings equal investment ($S = I$). This when the size of the flow of funds from the savings leakage is matched by the size of the flow of funds going out of the capital market as an injection.

In practice, however, there is no reason why the savings plans of households should match the investment plans of firms. They are independent decisions made by different people, for different reasons! Household saving decisions are influenced by the need for financial security and to finance future consumption. Firms invest to buy equipment which will be used to make goods and services which can be sold at a profit in the future. Firms may invest to expand their business, to take advantage of new innovations and improved technology, or because they hope economic conditions will be buoyant in the future. If the savings plans of households don't match the investment plans of firms, the circular flow of income may be out of equilibrium, and the level of income in the economy will rise or fall in the future. Disequilibrium, however, is probably the 'normal' state of the economy, because of the independence of savings and investment decisions.

If the flow of savings exceeds investment ($S > I$), the flow of income in the economy must contract, as leakages exceed injections. Total spending will be less than output, so unsold stocks of good held by firms (known as inventories) increase. Firms react to lower spending by cutting production and reducing the amount of resources they employ in production. This means households will receive less income, so consumption and savings will fall. This pattern will continue until savings again equals investment, at a lower level of total income.

If firms plan to invest more than households plan to save, on the other hand, there will be an expansionary effect on the circular flow causing the level of income to increase. Total expenditure will exceed current output causing inventory levels (stocks of unsold goods) to fall. Firms will react by increasing production and employing more resources, so incomes paid to households would rise. The level of economic activity will expand.

Only when the aggregate level of savings equals the aggregate level of investment will the level of income again be constant or stable.

We have explored **disequilibrium** (the inequality of savings and investment) in some detail because inequalities are a powerful force in causing fluctuations in the level of economic activity – the level of expenditure, quantity of output produced, and amount of income earned.

Note that equilibrium in the capital market does not necessarily imply an optimal level of economic activity (the level of income at which all resources are fully employed).

Figure 6.3 introduced the government sector into the circular flow model. Government expenditure on current and capital items is financed by taxation. For equilibrium in the government sector, the level of taxation must balance the level of government spending. That is,

$$T = G$$

When there is inequality between the taxation leakage and the government expenditure injection, the level of output and income in the economy will either rise or fall. If $T > G$, the amount of money withdrawn from the circular flow exceeds the expenditure injection, so the level of income in the future will be expected to fall. If $G > T$, on the other hand, the level of income can be expected to rise.

The open economy circular flow was introduced in figure 6.4. For equilibrium in the overseas sector, the leakage (spending on imports) must balance the injection (revenue from exports). That is,

$$M = X$$

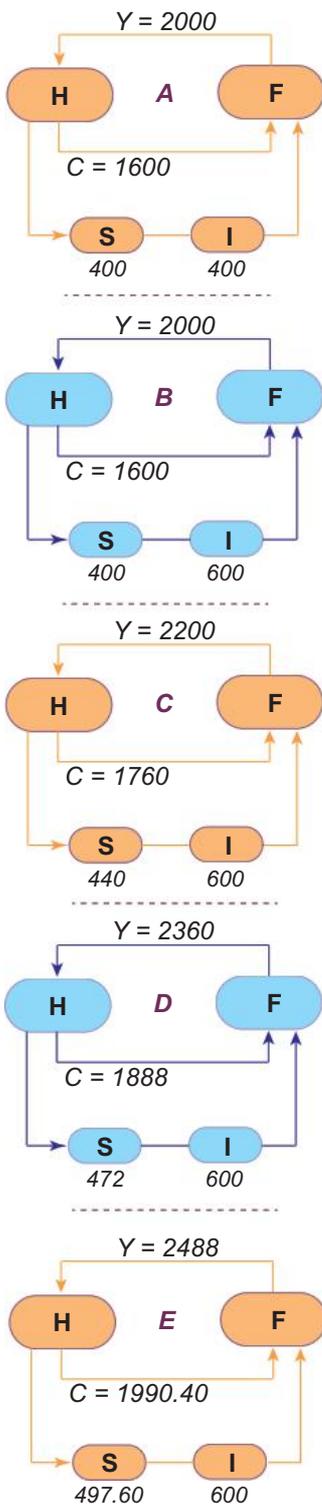
When there is an inequality between imports and exports, the level of output and income in the economy will either rise or fall. If $M > X$, the amount of money withdrawn from the circular flow exceeds the funds injected, so the level of income can be expected to fall. If $X > M$, on the other hand, the level of income can be expected to rise because injections of export revenue increase the size of the real and money flows circulating around the economy.

For equilibrium in the full circular flow model (i.e. the whole economy) the sum of the withdrawals ($S+T+M$) from the real and money flow between households and firms must equal the sum of the injections ($I + G + X$) going back into the flow. That is:

$$S + T + M = I + G + X$$

From this aggregate perspective, the sum of the parts is more important than the individual sectors. That is, imports could exceed exports if the shortfall was made up by extra government spending or investment. However, if $S+T+M > I+G+X$, aggregate withdrawals are greater than injections, and producer output and household income will fall. If $I+G+X > S+T+M$, aggregate injections exceed withdrawals, so household income and producer output will rise.

Figure 6.5 *The equilibrium process*



What happens when there are changes in leakages or injections?

Equilibrium is a theoretical concept. Economists are really more interested in disequilibrium – what causes it and how it changes levels of production, income and spending in the economy. This is a far more interesting topic to study. Figure 6.5 provides an illustration. Its sequence of simplified circular flow diagrams (households, firms and the capital market only) helps us understand what happens when there are changes in one of the leakages or injections. Consider time period A. \$2000 of goods and services have been produced by firms, creating \$2000 worth of income for households. Assume that households spend \$1600 on consumption, and save \$400. In other words, households spend 80 per cent of their income, and save 20 per cent.

$$\text{As } Y = C + S$$

$$\text{so } 2000 = 1600 + 400$$

In equilibrium, $S = I$. The \$400 savings leakage is injected back into the firms sector as expenditure on capital items ($I = 400$). Both conditions for equilibrium have been met.

As we know, households and firms save and invest for different reasons. Households save for financial security, to build wealth and to purchase things such as holidays, furniture and cars. Businesses invest to produce goods and services which they expect can be sold profitably in the future. As they have different motives, there is little reason why planned household savings should match planned business investment. When the savings and investment plans of households and firms are different, levels of expenditure, output and income in the whole economy will change, and the equilibrium level of income will also change.

Panels B through E in figure 6.5 illustrate these changes. Refer to panel B. Imagine that firms have growing confidence in the economy and expect that sales will rise, so they increase total investment from \$400 to \$600. The circular flow is now out of equilibrium, because total expenditure

(C + I) exceeds current levels of output and income (Y). The new investment expenditure expands the output of the firms sector in the next time period, so the level of income earned in the next period (panel C) will rise by the amount of the initial investment – from \$2000 to \$2200.

If households maintain the consumption and saving proportions we assumed above (i.e. they spend 80 per cent of income, and save 20 per cent), then consumption in panel C rises to \$1760 (an increase of \$160), and saving to \$440 (an increase of \$40). This is not the end of the adjustment process, however. The higher levels of consumption expenditure create extra demand for goods and services – firms produce more output to meet demand, and employ more factors of production. Thus income rises. In panel D, income and output rises to \$2360 to match total expenditure of \$1760 (consumption in period 3) plus \$600 (investment in period 3). In the last period, shown in panel E, income rises to \$2488 (\$1888 + \$600).

The economy will continue to expand after the initial increase in investment in panel B. The expansion will continue until a new equilibrium is reached, when the level of income is \$3000. Savings will again equal investment at \$600. At that level of income, the equality of investment and saving is restored, and $\Sigma Y = \Sigma O = \Sigma E$.

Equilibrium will probably be temporary, however. The level of economic activity is always changing because it consists of independent individuals and groups seeking to improve their own welfare. Thus the levels of savings and/or investment will change again in the future as the plans of firms and households respond to other events in the economy.

What if planned savings exceed investment? The panels in figure 6.5 showed the progressive changes in income, consumption and savings caused by an initial rise in investment – an increase in injections to the circular flow. If household savings increase, on the other hand, the level of income and output in the economy must contract. An excess of savings over investment means that less goods and services will be purchased by households, so firms will cut their output as they notice that

The resources boom and the circular flow model

Starting in 2003, commodity prices for minerals such as iron ore, LNG (gas) and coal rose strongly (as much as 3 times) due to demand from China and other Asian countries. The high prices, which lasted for a number of years, provided incentive for companies such as BHP, Rio and Chevron to invest heavily in mines and associated infrastructure, and the resulting boom is regarded as the strongest in Australia's history. Like all booms, it had to end. Commodity prices fell back as growth rates in China fell, and the new facilities paid for by the investment boom were completed.

Use the circular flow model to explain how both the boom, and the end of the boom, would have impacted on the Australian economy.

See ABC RN and search for 'The Mining Boom that Changed Australia' (Keri Phillips, 13 April, 2016).

their stocks (inventories of unsold goods) are rising. They might cut the overtime of their staff, or perhaps lay off some employees. This means the aggregate level of income in the economy will fall, so spending will again fall in the next time period (as will savings). The new equilibrium will be at a lower level of income.

Review quiz

- 1. Outline some benefits of developing 'economic literacy'.*
- 2. Describe how the product and factor markets in the circular flow model differ from each other.*
- 3. Explain the role of households and firms in the circular flow model.*
- 4. What happens to the equilibrium level of income when injections are greater than withdrawals?*
- 5. Give four examples of how you and your family participate in the circular flow of income.*

6.4 Gross Domestic Product (GDP)

Millions of economic transactions take place every day in the Australian economy. Households receive income from various sources, which they spend on food, clothing, transport, communication, leisure, and other goods and services. Households save a portion of their income. Businesses produce and sell goods and services. Banks borrow and lend, paying and receiving interest as they do so. Governments collect taxes which they spend for the benefit of the community. Australians trade goods and services with other countries, and they also borrow and invest in other parts of the world. The circular flow model depicts the economy as a constantly circulating flow of goods, services, and money. Statisticians and economists have developed national income accounting systems to measure these flows. In Australia, these are called the **National Accounts**.

The most frequently used measure of economic performance is the **Gross Domestic Product (GDP)** – defined as the total market value of all final goods and services produced in a country during a period of time (usually a year). There are three ways in which the level of GDP could be measured:

- the incomes and earnings approach, in which all incomes received are added
- the expenditure approach, which involves the addition of all spending on final goods and services
- the production approach, in which the value of all goods and services produced is calculated

Whichever approach is used, the results will be very similar. In this book, we follow the expenditure approach because it relates closely to the circular flow of income model, and to the way the Australian Bureau of Statistics (ABS) reports the national accounts .

GDP – The expenditure approach

Measuring GDP using the expenditure approach involves measuring the total expenditure on final goods and services produced by the four major sectors of the economy:

- household spending on goods and services – consumption (C)
- private investment spending by firms (I)
- government spending (G)
- net exports (overseas spending on Australian exports, minus Australian domestic spending on imports from overseas)

These types of expenditure can be expressed in an equation

$$\text{GDP} = C + I + G + (X - M).$$

where C = consumption expenditure; I = investment expenditure;
 G = government expenditure; X = exports; and M = imports.

A brief description of each component of GDP expenditure appears in figure 6.6. Describing aggregate expenditure patterns, and explaining why they change, enables us to explain and predict trends in economic activity.

Figure 6.6 The components of GDP expenditure

Element		Description
Consumption	C	a. expenditure on non-durable goods – food, clothing. b. expenditure on services – plumbers, accountants, c. expenditure on consumer durables – white goods, furniture, motor vehicles.
Investment	I	Business expenditure on new capital equipment which will produce final goods and services in the future – machines, factories, aircraft, tools etc. Also includes expenditure on new building and housing.
Government	G	G1: current expenditure associated with the day-to-day functions of government. G2: capital expenditure to provide for infrastructure such as schools, roads, power and communications.
Net Exports	X – M	The value of goods and services sold to overseas, minus the value of goods and services bought from overseas.

The size of the expenditure aggregates

Australia's GDP in 2020–2021 amounted to \$1,976bn (\$1.97 trillion). The largest component of GDP is **consumption** expenditure, which comprises approximately 54 per cent of the total (approximately \$1,067 billion). As shown in figure 6.6, personal consumption expenditure has three categories:

- expenditure on non-durable goods
- expenditure on durable goods
- expenditure on services

Non-durable goods are those that are consumed quickly after purchase (strictly, they may last up to three years). In the main, non durable consumption refers to spending on food, clothing and transport. Non-durable consumption accounts for about 30 per cent of aggregate consumption. **Durable** goods are those that can be expected to last (provide satisfaction) for three or more years, such as white goods (washing machines, fridges, ovens); and brown goods (furniture, lighter electrical products). Spending on durable goods accounts for about 10 per cent of consumption spending, and is **discretionary**, because households can bring forward or delay purchases according to their level of confidence in the economy, income, employment status and willingness to use credit.

Services include non-commodity items such as education, health, recreation, and utilities (such as power and water). In today's economy, spending on services actually makes up the largest component of consumption, accounting for about 70 per cent of the total.

Private investment is a significant component of aggregate expenditure. In 2020–2021, private investment amounted to about 18 per cent of GDP. Investment spending by private firms (gross private investment) includes:

- fixed investment (privately funded expenditure on the equipment and structures used in production)
- residential fixed investment (private expenditure on new housing)
- changes in business inventories (stocks of goods that have been produced but not yet sold)

Private investment is the most volatile component of aggregate spending. Over the last 50 years, private sector investment has accounted for between 16 per cent and 23 per cent of Australia's aggregate expenditure.

GDP components, 2020–2021		
Component	Value (\$bn)	% of GDP
Household consumption expenditure	1,058,563	54
Private investment	353,531	18
Government spending	526,363	26
Net exports	42,196	2
Gross Domestic Product (GDP)	1,976,658	100

Chain volume measures
Source: ABS 5206.0 September 2021

Investment, demography and development

Economic development and demography also influence investment activity. Countries with young populations at the start of their economic development surge spend a higher proportion of their GDP on fixed capital formation. GFCF (Gross Fixed Capital Formation) is a measure of gross investment in fixed capital assets by businesses, government and households. Australia spent nearly 28 % of GDP on GFCF in 1980, and 22% in 2020. By contrast, China's expenditure on GFCF has risen from 35% to 43% over the same period, pushed by the need to develop infrastructure and productive capacity in a rapidly growing economy with young people. Japan's GFCF declined from 35% to 24% (World Bank, 2021). The decline reflects the aging of its population and a period of slow economic growth that has lasted since the early 1990s.

Government spending includes all federal, state and local government expenditure on final goods and services, and investment in capital equipment and infrastructure. The federal government is responsible for the majority of this expenditure. Government expenditure accounts for about 26 per cent of GDP (although this was perhaps 4 per cent more than usual due to spending necessary to support households and businesses during the Covid-19 period).

Net exports (exports minus imports) are the final element of aggregate expenditure. Over fifty years, net exports have accounted for between -3 and +5 per cent of GDP (goods and services only).

Exports result in a flow of currency into Australia. Imports result in a flow of money from Australia to overseas markets.

6.5 The determinants of aggregate expenditure

Whilst economists are interested in the size of the spending flows described above, they are more concerned with how much they vary from year to year, and why they vary. Hence, we need to explore the factors that influence each component of aggregate expenditure.

Factors affecting consumption expenditure

Aggregate consumption spending includes household spending on day-to-day items such as food and clothing, services such as health and education (non-durable items) and household equipment such as white goods, furniture and electrical equipment (durables). The main determinant of aggregate consumption levels is the level of **disposable income** in the community. Other things being equal, households spend more on consumption when they earn more income. Because many households use credit (borrowed funds) to fund purchases of consumer durables, the **cost of credit** (interest rates) will influence consumption patterns. Lower interest rates, for example, tend to have a positive effect on aggregate consumption, for two reasons:

- interest repayments fall, taking a smaller slice of household disposable income

- the **opportunity cost** of expenditure on consumer items falls. Households with surplus funds can choose to spend or to save those funds. Saving is less attractive when interest rates are falling, as savers receive a lower return on their funds. Borrowing is more attractive, however. Rising interest rates, on the other hand, may lead to postponement of consumption, because repayments rise. Households choosing to spend would also forego the higher return that could be had from saving.

The current **stock of household wealth** plays an important role in determining aggregate consumption. Households that hold property or shares tend to ‘feel’ more wealthy when the values of those assets are rising, and are thus more likely to spend on consumer durables. This is known as the ‘wealth effect’. On the other hand, declining share values or property prices may result in households reducing their discretionary spending.

Expectations play a very important role in determining the willingness of households to spend. Expectations are the positive or negative feelings that people hold about the future state of the economy. They are influenced by recent economic trends such as the level of unemployment and the availability of jobs; government policy decisions; changes in interest rates and ‘economic news’. Changing expectations probably don’t have much effect on expenditure on basic commodities like food, clothing and transport, but they are likely to affect discretionary spending on items such as holidays and durable goods like electrical items, furniture, fashion clothing and motor vehicles.

Government policies also affect aggregate consumption. The government’s power to raise revenue through taxes, then spend that money, affects households’ disposable income. Likewise, Reserve Bank monetary policy decisions affects the cost and availability of credit.

Other influences on aggregate consumption include the distribution of income in the community and changes in demographic and institutional characteristics – such as the aging population and intergenerational change. ‘Gen Y and Gen Z’ Australians have different attitudes to home and car ownership than earlier generations, for example. We are also witnessing a rise in the circular economy – moving from a ‘take, make and dispose’ pattern of consumption to a more sustainable ‘reduce, re-use and recycle’ model.

Factors influencing investment expenditure

Investment is expenditure on producer or capital goods that are used to produce final goods and services in the future. As such, investment is very important for the future health of the economy. Private investment is the most volatile element of aggregate expenditure, swinging between 16 and 23 per cent of GDP in the last 50 years. It is important to remember that investment decisions concern the future. As the future is unknown, it involves **risk**. Many factors influence risk, including economic events; political decisions; international events; and changes in consumer tastes.

We should note here that technological progress is embodied in new capital items, so investment in more efficient equipment often lowers production costs and increases productivity.

A key driver of investment decisions is the current **profitability** of the business sector. This is because many firms retain a portion of their profits for expansion – to build premises or purchase equipment and machinery. When sales and profits are low, firms have less reserves to spend on new equipment, machinery and buildings. Investment spending often requires borrowed funds. Hence, the **rate of interest** charged on those funds is a major influence on investment decisions. Other things being equal, interest rates and the level of investment expenditure are inversely related. Thus higher interest rates tend to reduce investment spending because:

- interest rates represent the price of borrowed money – when interest rates are high, so too are repayments for equipment purchased with borrowed funds.
- interest rates also represent the **opportunity cost** of money. Firms have the choice of using money capital for investment, or for some alternative purpose. The opportunity cost of investment increases when interest rates are high. For example, if the interest rates on borrowed funds for small business were 8 per cent p.a., the desired rate of return on capital equipment (the ‘hurdle rate’) must be at least 8 per cent before a manager would consider investment to be a wise decision, other things being equal.

A distinction between nominal and real rates of interest should be made here. **Nominal rates** are the headline price of borrowed money (i.e. the stated or advertised interest rate on a deposit or loan). The **real rate of interest**, however, takes the rate of inflation into account. If nominal rates of interest are 8 per cent, and inflation is 4 per cent, then the real rate of interest is 4 per cent (8% minus 4%). Real rates of interest are a greater influence on business decisions than nominal rates.

A key determinant of investment is **business expectations**. Managers collect information which helps them form their view of the future, such as inquiries from buyers, sales levels, and current economic events in their industry. If expectations about future sales and profit levels are positive, it is likely that investment will increase. On the other hand, a downturn in the level of business confidence would see a reduction in planned investment. Business expectations also affect decisions about short-term production levels and employment plans.

Government policies influence investment directly and indirectly. Fiscal and monetary policies affect investment levels because they affect business costs (e.g. taxation), the cost of credit, and because they influence on the general level of economic activity. Sometimes, government policy can have a direct impact on investment. It would be appropriate, for instance, for the government to offer incentives for businesses to invest (such as subsidies, taxation allowances, overseas trade promotion) in a period of slow economic activity, or to encourage new initiatives to cut greenhouse gas emissions and reduce climate change.

Business expectations

Business expectations affect decisions about investment, job hiring and production levels, to name a few. Search for one of the business expectations surveys published in Australia (e.g. the Australian Chamber of Commerce and Industry survey or the Dun and Bradstreet Business Expectations Survey). Alternatively, do a keyword search on 'business expectations surveys'.

Who is surveyed, and what questions are asked? Why would such surveys be useful for economists and business advisers? What do the results of recent surveys show?

The government's regulatory framework can also affect market structures and the level of competition in the economy. In recent years, there has been considerable focus on improving business productivity, competitiveness and environmental sustainability. These changes influence on business investment as they impact upon production methods and costs, the availability of funds, and the competitiveness of markets.

To encourage investment, Australian businesses can currently claim an immediate tax deduction for the cost of an asset in the year the asset is first used.

The government itself undertakes long term investment in infrastructure. Because this infrastructure lays the foundation for future prosperity, government has in the past invested directly in public utilities such as power, water supply, roads, communications and education infrastructure. Today, many of these projects are carried out by private firms, or as public-private partnerships, especially in cases where the utilities can be run as profitable businesses capable of funding themselves.

Factors influencing government expenditure

In studying macroeconomics, economists tend not to pay much attention to fluctuations in government expenditure, partly because much of that expenditure is shaped by non-economic factors. Government spending rose significantly during the Covid-19 pandemic, for example . As a proportion of GDP, the level of government expenditure tends to be fairly stable from year to year. Government programs in health, education, social welfare and defence have ongoing current funding requirements (i.e. salaries and operating costs), and cannot be changed much in real terms. Some types of government expenditure do vary due to fluctuating economic conditions. Welfare payments, for example, increase when the economy is in a trough because cyclical unemployment tends to rise. Unforeseen events are also a drain on the public purse, as illustrated by economic stimulus packages, such as JobKeeper, used during the pandemic. Economists are, however, very interested in government **economic policies**. Cyclical fluctuations cause the government to make changes to taxation and expenditure as part of its macroeconomic management role. For example, it would be appropriate for the government to reduce investment subsidies if the economy was booming.

Factors affecting net exports

Exports and imports are also quite volatile components of aggregate expenditure, particularly in Australia which, as a **'small open economy'**, has a high intensity of trade. Because agricultural commodities make up a significant proportion of exports, it is important to note that the production of those commodities can rise and fall due to the vagaries of seasons. Producing a 'bumper crop' requires good weather with rain and sunshine at the right time. But a bumper crop does not guarantee a good economic return. A good season for Australian wheat or barley growers, for example, could mean that world supply increases and market prices fall! Similarly, seasonal conditions in other countries influence both the volume and price of commodities traded on world markets. These price movements are reflected in the terms of trade – an index of prices received for exports and paid for imports.

Economic trends in other parts of the world influence the demand for mineral commodity exports – witness the high demand in the first twenty years of the century for commodities like iron ore and coal as a result of economic growth and urban development in many countries in Asia. Recent changes to economic regulation in China, however, might augur badly for the level of Australia's mineral exports in the future.

Domestic levels of economic activity influence Australians' propensity to import. Traditionally, Australian imports are **elastic** with respect to GDP – if GDP rises by 2 per cent, then it is likely that imports will rise by a larger amount. This has much to do with the small size of Australia's economy. In periods of high economic activity, consumers import goods which cannot be sourced from local manufacturers, and businesses purchase capital equipment that might not be produced domestically.

The **exchange rate** is an important influence on net exports. Exchange rates are determined by market forces (demand and supply). When the Australian dollar (\$A or AUD) appreciates, one Australian dollar (AUD1) can buy more units of other currencies, and people overseas can buy less units of AUD (i.e. it costs them more to buy Australian goods and services). In other words, appreciation makes the price of imports cheaper for Australian buyers, but makes our exports more expensive (and thus less competitive) in overseas markets. Similarly, if the AUD loses value against other currencies (depreciates) exports become more competitive in overseas markets, but imports become more expensive for Australian buyers.

Figure 6.7 summarises the factors that affect each of the components of aggregate expenditure. Understanding why each of these components of expenditure can change helps to unlock the secrets of the business cycle, which is the subject of the chapter eight.

Figure 6.7 The determinants of aggregate expenditure

<p>Factors influencing aggregate consumption expenditure</p> <p style="text-align: center;">C</p>	<ul style="list-style-type: none"> • disposable income (Y_d) • interest rates (r) • expectations • household confidence • stock of wealth (property, shares) • government policy
<p>Factors influencing aggregate investment expenditure</p> <p style="text-align: center;">I</p>	<ul style="list-style-type: none"> • business expectations • interest rates (r) • level of past profits (π) • government policies (e.g. taxation)
<p>Factors influencing government expenditure</p> <p style="text-align: center;">G</p>	<ul style="list-style-type: none"> • determined in accordance with • government policy objectives e.g. social welfare, health, education, full employment, economic growth, income redistribution
<p>Factors influencing net exports</p> <p style="text-align: center;">X - M</p>	<ul style="list-style-type: none"> • domestic business cycle • overseas business cycle • exchange rates • commodity prices • terms of trade

Review quiz

1. *Distinguish between durable and non-durable consumption.*
2. *Explain the impact of an increase in interest rates on (a) durable consumption; (b) non-durable consumption; (c) services; and (d) private investment.*
3. *Explain how 'expectations' influence consumption and investment spending.*
4. *What is the likely relationship between investment and business profitability?*
5. *List the factors affecting net exports. Explain why net exports often have a negative sign in Australia's expenditure accounts.*

7 Economic Growth



Learning objectives

In this chapter, you will learn about

- *the concept and measurement of economic growth*
- *the distinction between nominal Gross Domestic Product (GDP), real GDP and real GDP per capita*
- *GDP as a measure of economic growth*
- *the determinants of economic growth*
- *the costs and benefits of economic growth*

Macroeconomics is the branch of economics that studies the performance of the economy as a whole. The remaining chapters in this book explore some of the key macroeconomic concepts that help us to understand our economy's performance. Firstly, we need to understand the macroeconomic objectives and performance benchmarks.

7.1 Macroeconomic objectives

The key macroeconomic objectives in developed countries are:

- sustainable economic growth
- price stability
- full employment

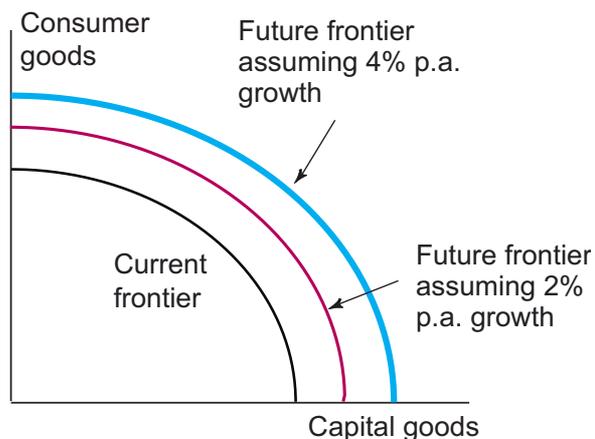
Economic growth is defined as an increase in the real output of goods and services produced in a country. Growth is usually measured by the annual change in real Gross Domestic Product (GDP). For Australia, a desirable rate of growth is in the region of 3 per cent per annum. If growth is much slower than this, it can be difficult to achieve full employment. If growth is too rapid, on the other hand, there may be some pressure on the price level if total demand is growing faster than the capacity of the economy. High rates of growth could also make it difficult to ensure the sustainability of scarce resources.

As will be explained in the next section, the use of the term 'sustainable' recognises that economic growth has both benefits and costs, and that an appropriate rate of growth is one that can be maintained without creating significant problems for future generations.

Price stability refers to low rates of inflation. Australia's inflation target is between 2 and 3 per cent per annum. As will be discussed in chapter 9, achieving price stability is important because inflation adversely affects the spending power of households and firms; erodes international competitiveness; distorts the distribution of income; and influences the allocation of resources throughout the economy.

Full employment occurs when everyone who is willing to work can find employment. This does not mean a 'zero' rate of unemployment, as discussed in chapter 10. Rather, the objective is to achieve a rate of unemployment consistent with the **natural rate of unemployment** – currently around 4.5 per cent of the workforce.

In setting these objectives, economists recognise that the economic problem applies as much to national objectives as it does to personal goals – at any point in time, the nation has limited resources with which to meet its unlimited wants. Not all objectives can be achieved at once, so there are choices to be made and trade-offs to be considered. It is not possible to achieve all the objectives simultaneously because they are not all compatible. Growth and full employment tend to be compatible because both rely on expanding economic opportunities, for example. Other objectives may bring about conflicts in policy making, such as the inflationary risks associated with attempts to reduce unemployment. As a result, choices once

Figure 7.1 Economic growth and production possibilities

The production possibility curve (or frontier) is a model which shows all the combinations of output that an economy can produce using its available resources at a point in time. The black line shows the current opportunity set for the economy. If the economy grows at 4 per cent per annum in the future, it will be able to achieve higher levels of output and material welfare than it could achieve if the average rate of growth was 2 per cent p.a. Thus, current rates of growth affect future production and consumption possibilities for the community.

again have to be made between alternative courses of action, and national economic objectives have to be prioritised. This will become more obvious as the chapters discussing economic performance unfold. Firstly, in this chapter, we discuss the most significant macroeconomic objective – sustainable economic growth.

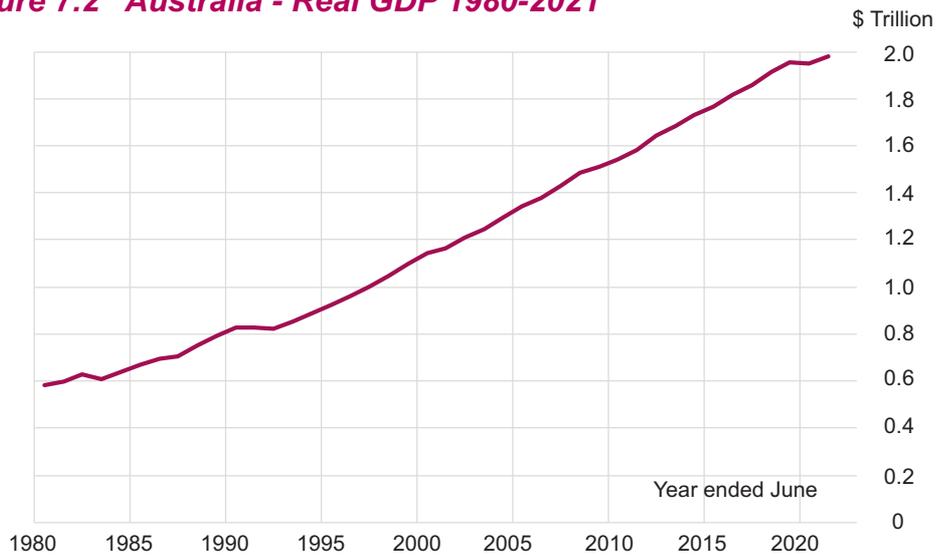
7.2 Economic growth

Economic growth refers to an increase in the real output of goods and services produced in a country. That not only means people are better off now, but that the capacity of the economy to provide for their needs in the future is also increased. This can be modeled using the **production possibility model**, as illustrated in figure 7.1. Current growth expands the ‘opportunity set’ for the future. If the rate of growth for this year was 4 per cent per annum, the future production frontier will be further from the origin than it would be if growth was, say, 2 per cent.

Measuring economic growth

The most frequently used measure of economic performance is Gross Domestic Product (GDP) – the total market value of all final goods and services produced in a country during a period of time. Figure 7.2 describes the increase in Australia’s real GDP between 1980 and 2021. At constant prices, GDP grew from around \$580 billion in 1979–80 to reach some \$1,976 billion (\$1.97 trillion) in the 2020–2021 financial year (July 1 to June 30). The GDP exhibits a slow, steady upward trend, but there do appear to be some periods of faster (and slower) growth. There is also a slight upward curve over time, which is due to the compounding effect of growth on growth.

A distinction should be made between **nominal GDP** and **real GDP**. Nominal GDP is the value of output expressed in the prices of the day (current prices). Constant price (real) GDP is adjusted to remove the effect of price increases. Real GDP tells us what the value of output is worth as if there had been no price changes in the economy.

Figure 7.2 Australia - Real GDP 1980-2021

Source: ABS National Income Accounts Table 34 September 2021

An example will illustrate. Figure 7.3 shows that a small 'economy' produced 50 dresses (each priced at \$40) and 30 trousers (each priced at \$60) in Year 1. The total value of output in Year 1 was thus \$3800. In year 2, the production of dresses rose by 3 units, but the price of each unit remained at \$40. Trouser production remained at Year 1 levels (30), but the price of trousers rose from \$60 to \$63. Thus nominal GDP in Year 2 is \$4010 (the total value of production in current prices). Apparent growth is

Figure 7.3 Nominal (current price) and real (constant price) GDP

	Year 1 (base year)				Year 2				Year 3			
	Total value of production				Total value of production				Total value of production			
Item	P	Q	At current prices	At constant (Year 1) prices	P	Q	At current prices	At constant (Year 1) prices	P	Q	At current prices	At constant (Year 1) prices
Dresses	\$40	50	\$2000	\$2000	\$40	53	\$2120	\$2120	\$41	55	\$2255	\$2200
Trousers	\$60	30	\$1800	\$1800	\$63	30	\$1890	\$1800	\$64	32	\$2048	\$1920
	P = price Q = quantity		Nominal GDP	Real GDP			Nominal GDP	Real GDP			Nominal GDP	Real GDP
			\$3800	\$3800			\$4010	\$3920			\$4303	\$4120
	Annual growth rate in nominal terms (current prices)						4010/3800 = 5.6%		4303/4010 = 7.3%			
	Annual growth rate in real terms (constant year 1 prices)						3920/3800 = 3.2%		4120/3920 = 5.1%			

Percentages rounded to one decimal place

\$4010/\$3800 or 5.6 per cent! But how much of this growth is due to increased output, and how much to changing prices?

Some of the apparent growth in the value of output was due to the rise in the price of trousers – from \$60 to \$63. At constant prices (that is, prices from Year 1), Year 2 output was \$3920 (53 dresses at \$40 each, plus 30 trousers at \$63). This is a 3.2 per cent real increase on Year 1. In Year 3, nominal GDP (at current prices) is \$4303, but the prices of dresses increased from \$40 to \$41, and trouser prices rose to \$64. At constant (Year 1) prices, GDP is \$4120. The effect of price increases over the two years has been removed, so we can compare the ‘true’ value of output across the three years, and calculate the year-on-year real rate of economic growth – 3.2 per cent in Year 2, then 5.1 per cent in Year 3. Adjusting the GDP data to account for the price changes has thus exposed the real increase in the value of production in this two-good economy.

Figure 7.2 describes a slow, steady upward trend in GDP. Economists are interested in the rate of change in GDP (the **rate of economic growth**). To calculate the rate of increase, use either of the following methods:

$$\text{GDP \% change} = \frac{\text{GDP}_{(\text{year 2})} - \text{GDP}_{(\text{year 1})}}{\text{GDP}_{(\text{year 1})}} \times 100$$

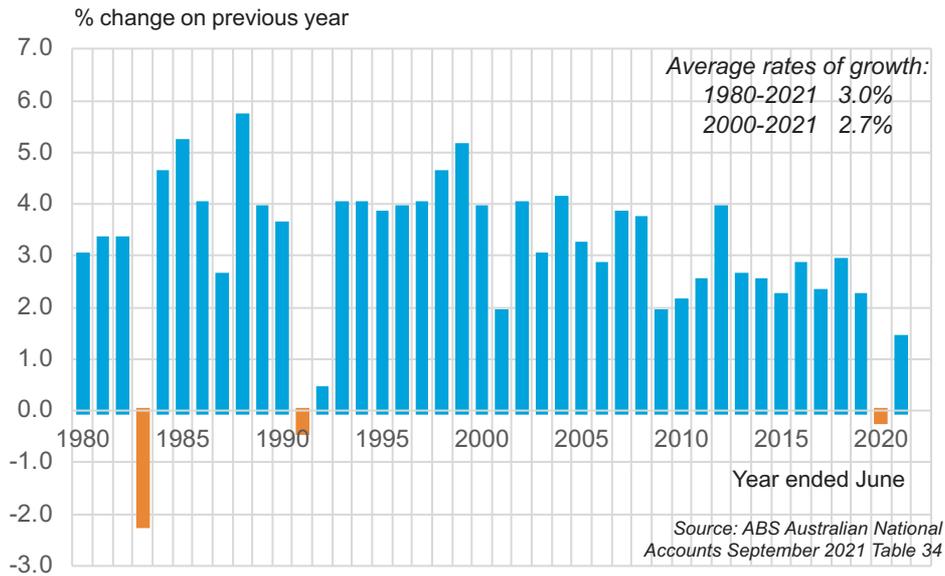
or

$$\text{GDP \% change} = \frac{\text{GDP}_{(\text{year 2})}}{\text{GDP}_{(\text{year 1})}} - 1 \times 100$$

ABS data showed that the GDP at June 2021 was \$1,978,632 million, up from \$1,949,385 million in June 2020. Substituting these numbers into the second formula, we find the annual rate of growth is 1.5 per cent:

$$\text{GDP \% change} = \frac{1978632}{1949385} - 1 \times 100 = 1.015 - 1 = 0.015 \times 100 = 1.5\%$$

The ABS also releases quarterly GDP data (the rate of growth over any three month period). Rates of change are then compiled by substituting ‘quarter’ for ‘year’ in the either formula. See figure 8.4 in the next chapter for an example. Figure 7.4 is based on the data used in figure 7.2, but the chart’s columns show annual GDP growth rates. The average rate of economic growth over the period is 3.5 per cent (although the average rate since 2000 is 2.9 per cent). The highest annual rate over the period was 7.6 per cent in 1964; the lowest minus 2.2 per cent in 1982–83. Growth was -6.9 per cent (June on June; -0.2 per cent on an annualised basis) in 2019–2020 (reflecting the impact of the Covid-19 pandemic on spending and production).

Figure 7.4 GDP growth rates (annual): 1980 – 2021

Adjusting GDP data to account for population growth

Between 1980 and 2021, Australia's population grew from 10 million to 25.7 million people. As shown in figure 7.5, we can divide real GDP by the population to determine real GDP per capita (per head of population). In current price terms (not shown in the table), GDP increased approximately 9 times over the period. Real GDP increased by about 3.3 times and per capita GDP increased just 1.9 times! Between 2015 and 2020, per capita GDP increased by just 2.2%!

Figure 7.5 Australia: Real GDP per capita

Australia's real GDP has increased by a factor of 3.3 over the period 1980 to 2020. If rising population is also accounted for, then the average person in 2020 was 1.9 times better off than their grandparents in 1980.

Source: RBA, ABS (derived)

Year	GDP \$m in constant prices	Population (millions)	Real GDP \$ per capita in constant prices
1980	582339	14.7	39616
1985	671505	15.7	42771
1990	825628	17.1	48282
1995	926807	18.1	51204
2000	1143119	19.2	59537
2005	1340222	20.3	66020
2010	1542946	22.4	68881
2015	1765938	23.8	74199
2020	1949385	25.7	75851

Review quiz

1. Define the term 'economic growth'.
2. One economy grows at 2.5 per cent per annum over a period of ten years. Another grows at 3 per cent per annum over the same period of time. Use an economic model to show how different growth rates can impact on production possibilities at the end of the decade.
3. Distinguish between nominal and real GDP.
4. Write the formula to calculate the rate of growth in GDP over a one-year period.
5. Australia's average rate of growth is 3% per annum. Is growth in GDP per capita higher or lower than this? Explain.

7.3 GDP as a measure of growth

GDP measures the dollar value of all of the goods and services made and purchased within one year. Essentially, GDP is a measure of economic activity – the money spent by households, businesses and governments. But is the dollar value of something a true measure of its significance and contribution to society's well-being?

One of the problems of GDP as a measure of activity is that it only includes the value of goods and services that are exchanged for payment. Other important activities such as housework; the work of charities; voluntary work; and do-it-yourself activities also contribute to our material welfare. The value of these **non-market** items is not officially estimated or recorded because there is no exchange of a good or service in return for payment. Hence GDP understates the 'true' value of production by omitting non-market activities.

“What we measure informs what we do. And if we're measuring the wrong thing, we're going to do the wrong thing.” Joseph Stigler, World Economic Forum, Davos, 2016.

GDP data also tends to understate changes in **utility** (an economic term that refers to the ability of a good or service to satisfy wants). Many products available today deliver better performance than equivalent products produced a decade ago. 'Smart' televisions can stream content from the Internet; cars are safer and more fuel efficient; and people can now conduct videoconferences on their telephone! GDP data doesn't capture the significant technological progress that has increased the usefulness (utility) of these items, yet their dollar value (price) has changed very little, and possibly declined in real terms!

GDP doesn't account for rising **productivity** (output per unit of input). Productivity has risen slowly over the years as the knowledge and skills used by labour rises, and more capital equipment is used in production. Rising productivity has helped to deliver growth and some of the benefits it delivers, such as increased leisure time. GDP numbers could also overstate progress. If growth occurred because more people

worked overtime, or held two jobs, then we might question whether rising material welfare was worth the costs of achieving it. The national accounts don't report on the working conditions of people in offices, factories, farms and mines! Many fly-in fly-out workers find their rosters are tough on themselves and their families, despite the monetary benefits involved. Many other workers complain about long hours and their problems with 'work-life balance'.

The economist who won the 1971 Nobel Prize for his work on national income accounting and growth, Simon Kuznets, warned that GDP was not necessarily a suitable measure of a country's economic progress. He pointed out that GDP could go in the opposite direction of welfare! People don't measure their well-being by material standards alone. Other 'metrics' such as health; life expectancy; family life; crime; poverty; leisure; the quality of the environment; and the distribution of income are also important in how people feel about their welfare and progress. It cannot be assumed that people are better off just because incomes have grown and households have more spending power. The last three decades have seen more focus of the notion of sustainability, which refers to responsible use of resources so they continue to be available to satisfy wants and needs in the future.

GDP may show increasing income, consumption and investment over years, but that economic activity also carries social (stress; family breakdown) and environmental costs (climate change; pollution; resource depletion) that diminish real progress. We now recognise that some of the ways we use natural and human resources actually reduce our welfare or standard of living, and hence should be regarded as **economic bads** (meaning that they are the opposite of 'goods').

A growing economy places more pressure on what is essentially a fixed resource – the natural environment. As discussed in chapter 5, we now regard the industrial-scale use of natural resources such as the forest and the fishery as examples of market failure – where the market fails to produce the optimal or 'best' outcome for society. Apart from being a source of timber and fuel, forests also have value in terms of their scenic value; in reducing atmospheric carbon; in providing a habitat for wildlife, and as a barrier to soil erosion. The contribution that forests make to GDP each year from timber production and burning of fuel may significantly understate their value if retained as a natural resource over years to come. The value of output created by the use of timber for construction and fuel purposes may not compensate adequately for its conserved value. How could we calculate, and include in GDP, the future value of this and other resources such as water, fish and the air?

A number of alternative ways of thinking about, and measuring, economic growth have been proposed. Some are based on a wider range of indicators than just output and income. These include the Measure of Economic Welfare; the Index of Sustainable Economic Welfare (ISEW); the Genuine Progress Indicator (GPI); and the Measure of Domestic Progress (MDP). As their names imply, they adjust conventional economic measures such as GDP by including social and environmental costs and benefits that lie outside the normal national accounting framework because they are more difficult to value using 'dollars'.

Some alternatives are built on subjective measures of welfare and progress. One of these is 'happiness'. There is evidence that financial satisfaction and life satisfaction (happiness) are associated in the short term, but not in the long term. The **Happy Planet Index** (New Economics Foundation) is one measure that includes subjective data. It has four components:

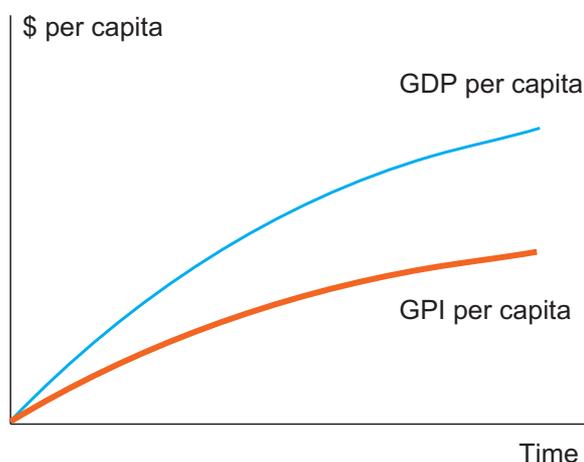
- life expectancy – an indicator of the standard of health in a country
- experienced well-being – a subjective indicator of how people feel their lives are going overall
- inequality of outcomes – a measure of how unequal the distribution of life expectancy and experienced wellbeing scores are within a particular country
- ecological footprint – the average amount of land needed per head of population to sustain a typical country's consumption patterns

A common feature of growth studies that include social, environmental or subjective information is modeled in figure 7.6. The GDP data traditionally used to measure growth may rise over time, but other measures show a slower rate of 'genuine' progress.

Other measures relate to economic development, but that concerns standards of living at a point in time, not the rate of change in welfare over time. One example is The **Human Development Index (HDI)** – a summary measure of average achievement in what the United Nations believes are key dimensions of human development:

- a long and healthy life (measured by life expectancy at birth)
- being knowledgeable (measured by the average years of schooling for adults, and the expected number of years for children entering school)
- having a decent standard of living (measured by Gross National Income per capita)

Figure 7.6 Adjusted growth measures



Historical growth over time using a GDP measure tends to show a path like the blue line - initial rapid growth which levels off over time as an economy enters a mature industrial phase.

Adjusted measures estimate the value of items that may increase or decrease social welfare. Housework, parenting and volunteering increase welfare, but crime, commuting time and the loss of productive land (for example) reduce welfare. If social welfare has been reduced, the 'Genuine Progress Indicator' (GPI) is 'flatter', like the orange line.

All of these alternative measures have their own conceptual and methodological problems. GDP may not be a 'perfect' measure of economic progress, but it does provide a consistent measure of economic flows over time. The point of establishing wider measures of growth and progress is to improve our economic awareness and inform public policy. In developed countries, happiness is often related to success in doing things of everyday life – making a living, raising a family, maintaining good health, and having a rewarding job. That suggests that public policy might be better to target effective welfare, unemployment reduction and even minimum incomes!

Review quiz

- 1. List three reasons why GDP statistics may understate the 'true' size of the economy and its rate of growth.**
- 2. List two reasons why GDP statistics may overstate the 'true' size of the economy and its rate of growth.**
- 3. Describe the meaning of the term 'sustainability' in relation to economic growth.**
- 4. Give one example of an economic 'bad' that could be regarded as a type of market failure.**
- 5. List three measures you would use to evaluate your own standard of living. List three measures that your parents might use.**

7.4 The determinants of economic growth

We need to distinguish between potential and actual economic growth. The determinants of **potential growth** are those that increase the capacity of the economy to produce more goods and services with available resources. **Actual growth** at any point in time is determined by how much expenditure is taking place to consume those goods and services. We know this from chapter 6 – GDP is the sum of all expenditure in the economy.

But what determines a country's potential growth? Simply put, potential growth is determined by the quantity or economic resources it has available, and the 'quality' of those resources – the ability they have to make a contribution. One source of growth could be exploring for, and developing, more resources! This was the basis of Australia's growth in the mid-late 1800s, when there were gold booms in Victoria, NSW and WA, and rapid growth in agriculture and pastoral industries to meet demand from Britain (especially for wool). Mineral and energy resources have also been important contributors to economic growth in recent times, examples being the iron ore boom that saw state growth rates up to 8 per cent in Queensland and WA in the early 2010s. Finding new mineral deposits obviously increases the quantity of those resources that can be used in production.

In advanced economies, however, economic growth as measured by increasing GDP has slowed in recent years – over the period 2000-2020, average annual growth was 2.7 per cent in Australia. Attention has thus focused on how human and capital resources can be sources of growth. In modern economies such as Australia, potential growth has three drivers:

- the number of people in the working-age population (**population**)
- the proportion of those who work and their working hours (**participation**)
- the amount of output produced per hour worked (labour **productivity**)

Australia's current population should reach 26 million people by 2025. The annual average population growth rate has been about 1.4 per cent over the past 40 years. Forty per cent of that is due to natural increase (the excess of births over deaths in the resident population). Natural increase in 2019 was 140,000 people. Australia's fertility rate (number of births per woman) has been in decline in Australia for 30 years, and is now 1.6 births per woman – less than the replacement rate of 2.1. Despite this, natural increase has contributed positively to population growth because the number of women of childbearing age has increased, and because death rates have fallen – from nine to six per thousand people over the last fifty years.

Sixty per cent of Australia's population increase in recent years is due to migration. Net overseas migration refers to the gain or loss of population through immigration and emigration. Over the period 2010 to 2019, net overseas migration averaged 215,000 people per annum (ABS, Migration Australia, April 2020).

Population growth contributes to economic growth because:

- A larger population increases the total size of the economy, meaning greater demand for goods and services and the productive factors used to make them (including labour).
- Population growth increases the size of the labour force. Migration has a more immediate impact on the labour force than natural increase, as most migrants are of working age, and qualified for migration by virtue of their skills or intention to start a business.
- Migration promotes growth because it involves the transfer of wealth, knowledge and skills from overseas. It also slows the aging of the population and it has a positive fiscal impact, as working migrants pay taxes. Temporary migrants such as students often transition to Australian residency.

Decade	Annual average % p.a.
1960s	5.5
1970s	3.8
1980s	3.6
1990s	3.2
2000s	3.2
2010s	2.7

Source: ABS, Australian National Accounts

Country	Annual average % p.a.
United States	2.3
Great Britain	1.9
Japan	1.3
Germany	1.9
China	7.0
India	5.0
Indonesia	4.5
Kenya	4.9

Source: Trading Economics

A high rate of **labour force participation** is crucial to Australia's economic growth in the future. Work has benefits for individuals and households such as financial security and social connection, in addition to its contributions to society such as its fiscal impact (higher government revenue and reduced need for welfare). The labour force participation rate is the proportion of people over 15 years old who are in paid work, or actively looking for work. Australia's participation rate was 66.2 per cent as at June, 2021.

Over the period 1980–2020, workforce participation by men between 25 and 54 years of age has fallen from 95 per cent to 90 percent. On the other hand, participation by males aged 65 plus has risen from 12 per cent to 20 per cent, possibly due to changing social attitudes about older workers, the less physical nature of the employment opportunities, and greater availability of part-time work. The female participation rate has risen for all age groups over the same period – most significantly for the 25-64 year age group, where it rose from about 52 per cent to 76 per cent. Higher participation by women has occurred in all industries, but especially those in the service sector. Rising female participation reflects a number of trends, such as:

- reduced barriers to female participation in work
- attitudes to work and family have changed, with men being increasingly likely to work part-time and contribute to domestic tasks
- greater equality of workplace opportunities
- two-income families can better meet the challenges of higher housing cost

What is the relationship between workforce participation and economic growth? High involvement in work helps to overcome the effects of an aging workforce, and to sustain government tax revenue that is declining for the same reason. The rising participation of women has increased their own, and their family's, financial security and contributes to higher levels of aggregate demand. Increased participation by older males increases the level of experience and 'tacit knowledge' in the workforce.

Rising **productivity** is estimated to have been responsible for about half of real economic growth in Australia over 20 years. Productivity is generally thought of as labour productivity – the amount of output produced per hour worked. Rising labour productivity has two causes. Firstly, in advanced economies, nearly all work tasks involve the use of capital equipment (capital being defined as the man-made resources which assist human resources in the production of good and services). As time goes on, that equipment is often increasingly complex due to technological change and innovation. But that makes it more useful! For example, carpenters who used to rely on a hammer now use a nail gun; teachers used to be 'chalkies', but now use presentation slides projected from a computer to a screen; and doctors often use sophisticated scanners to supplement traditional x-rays.

Capital deepening is the term used to describe such changes. Strictly, capital deepening is an increase in the stock of capital relative to the stock of other productive resources. But what usually happens is that the stock of equipment also embodies

technological changes and improvements of function. The result is that production has become more capital intensive, and helped to increase the amount of output workers can achieve in a given amount of time (i.e. labour productivity).

Secondly, there are many other factors that have an influence on labour efficiency over time. These are collectively called the drivers of '**multi-factor productivity**'. Arguably the most important of these changes is **human capital**, which is the knowledge and skills that workers develop through education and experience. Human capital may be developed, for example, by the provision of:

- the basic building blocks of a productive workforce – social infrastructure such as schools, hospitals, and communications
- education, which develops the skills, knowledge and understandings that enable people to take their place in the community, as well as developing knowledge and skills which can be used in the workplace
- further education and on-the-job training, which develops job-related skills (although the importance of hands-on experience in a particular job must also be noted here)

People 'invest' in their own human capital by enrolling in education and training programs. Presumably, they enrol because they expect their 'investment' (of time, effort, money and lost opportunities) to provide a positive rate of return in the future (i.e the income and benefits will exceed the costs and effort of the qualification). Similarly, firms 'invest' in human capital (by hiring more skilled workers or training current workers) because, other things being equal, skilled workers are more productive.

Governments encourage investment in human capital for paternalistic reasons – because it is 'good' to have a more knowledgeable community. The social benefits of higher education include the difference in taxes paid by trained workers and the untrained ones; a more adaptable workforce; and a view that educated people are likely to contribute more to their community (e.g. being literate, able to understand complex issues and contribute to public life).

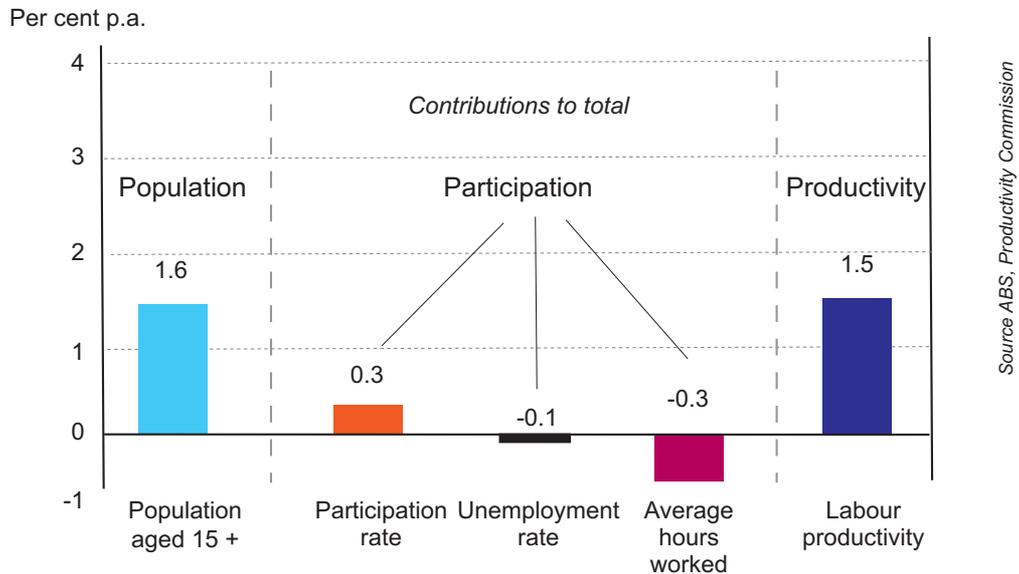
Other factors that play a role in improving multifactor productivity include:

- better management – managers coordinate the natural, human and capital productive inputs
- research and development, and innovation, which contribute to better products and processes
- increasing competition in the economy, which provides incentives for new companies and products at the expense of old ones

So 'multifactor' is really a term that captures all of the other factors that improve workers' ability to produce goods and services, apart from the capital equipment they use. We said that the 'three Ps' influence potential economic growth. Figure 7.7 illustrates the contribution each of these growth drivers has made to the growth of real GDP per person (on average) over the past twenty years. Over the period, average increase in growth per capita was 3 per cent, made up of:

Figure 7.7 Contribution to potential growth 2000–2020

Average increase in real GDP 2000–2020 = 3% p.a. The contribution to this total of each of the '3 Ps' is shown by the height of the columns (in percentage points).



The chart breaks down the components of potential growth in the Australian economy. About half of total growth is due to each of population and productivity increases. A small rise in workforce participation has been balanced out by a decrease in hours worked per week, and a small rise in unemployment.

- an increase in working age population (1.6 percentage points, or half of the total)
- an increase in the participation rate (0.3 per cent)
- employment slightly lower than natural rate -0.1 per cent)
- a fall in average hours worked -0.3 per cent)
- an average rise in labour productivity of 1.5 per cent

Note that the discussion has centered on the potential rate of economic growth (the supply side). As will be discussed in the next chapter, the actual rate of economic growth in any year depends on the 'demand side' – the willingness of households to buy the goods and services produced. When the economy enjoys a boom, for example, economic growth is above trend because the total level of spending is higher than average. The highest rate of economic growth between 2000 and 2020 was just over 4 per cent in 2003–2004. Output, income and spending rise in a boom. If output, income and spending are below trend, however (an economic downturn), actual economic growth rates will come in below potential. The lowest rate of economic growth in the period 2000–2020 was -6.9 per cent (year-on-year), reflecting the impact of the Covid-19 pandemic on economic activity.

As we discuss in chapter 13, the pandemic will have a lasting impact on economic growth, even if recovery is relatively speedy.

Review quiz

1. Name the 'three Ps' that drive the potential rate of economic growth over time.
2. Why would migration contribute more to economic growth in the short term (3-5 years) than natural population increase?
3. Provide three reasons why the workforce participation rate has risen in Australia over a forty year period.
4. Define the terms 'capital deepening' and 'labour productivity'.
5. Why are actual economic growth and potential growth different things?

7.5 The benefits and costs of economic growth

Like all economic events, growth has both benefits and costs for individuals and groups in our community.

Growth brings a number of benefits, such as:

- increasing real income and material welfare
- higher quality goods and services
- more economic opportunities
- a taxation dividend to government

Over time, economic growth increases **material welfare** throughout the economy – rising real incomes mean people are able to purchase more goods and services and satisfy more wants and needs. As previously described, the average Australian today is about 2 times better off in real GDP per capita terms than was the case in 1980.

Because economic growth is associated with higher incomes and greater production of final goods and services, it stands to reason that there will also be more demand for the factors of production (natural, human and capital resources) used to produce them. As a result, economic growth is associated with greater business and employment opportunities, because individuals and businesses have an incentive to participate in growth. The demand for economic resources is called **derived demand** – it is based on the demand for the final goods and services that the resources will be used to produce.

Growth has a **fiscal dividend** because rising incomes bring higher taxation receipts for government, which in turn enables more spending on **social overhead capital** – infrastructure, health and education. Growth is associated with improvements in resource use **efficiency** because it tends to promote knowledge, skills, productivity and technological change. Each of these leads to higher quality goods and services being available.

Economic growth also has a number of costs:

- it may not raise the living standards of everyone in the community at the same rate
- it may bring inflationary pressure;
- it is associated with structural change in the economy
- it is associated with economic 'bads,' as well as 'goods'
- it has social costs,

The benefits of economic growth are not necessarily evenly spread amongst the population. On one measure of **income inequality**, the **Gini Coefficient**, the distribution of income in Australia is slightly more uneven now than it was in 1960! The share of total income going to the top one per cent of income earners was around 4.5 per cent in 1980, 3.5 per cent in 2000 and over 5 per cent in 2020 (Productivity Commission, 2019). Does this matter? Yes, because a number of society's problems are associated with income and wealth inequality – health and life expectancy; educational attainment; crime; and social cohesion being a few. These are long term problems, the costs of which are borne by the whole community.

High rates of growth may put pressure on prices, especially if resources are fully employed and the economy is working near its capacity. Growth rates above 5 per cent in developed economies are associated with pressure on resource prices. Imagine you were a construction engineer in a booming economy with cranes all over the skyline – that would be a signal to you that your sector was enjoying good times, so you might think about asking your boss for a pay rise!

Although growth creates employment opportunities, it is also associated with **structural change** – changes in the distribution of output, income and employment over time. Structural change is a constant feature of modern economies, as illustrated by:

- the change in electricity production and distribution systems – shifting away from oil, gas and coal towards renewable sources such as solar and wind power
- the shift from living in detached suburban houses to apartments in main cities
- the decline of manufacturing and the rise of the knowledge economy

These examples reflect changes in both the demand and supply sides of the economy – structural change happens when people want new types of goods and services, and when invention, innovation and technological change makes them possible. Change is also driven by businesses seeking to reduce costs of production.

As part of the structural change process, different sectors of the economy grow at different rates – resulting in reallocation of resources across economic sectors and geographical regions. This sometimes means there are 'winners' and 'losers' from change, examples being the shift of resources away from the oil, gas and coal sectors into renewable energy, and the shift of jobs from the manufacturing to emerging

industries built on biological sciences, artificial intelligence and smart systems. In twenty years, perhaps forty per cent of students reading this book will have a job that has not yet been invented! You may need to retrain at some stage to pick up the skills required for your unknown occupation.

Environmental problems are also associated with high rates of economic growth. As we have seen, growth is usually measured in terms of the increasing value of output. But GDP does not account for economic 'bads' such as climate change, pollution and resource depletion. Typically, such problems arise when the environment is treated like a 'free good' and because of the negative externalities that arise when social costs or production or consumption exceed private costs. Although a wealthier society may show more interest in environmental matters, it is also more likely to harm the environment.

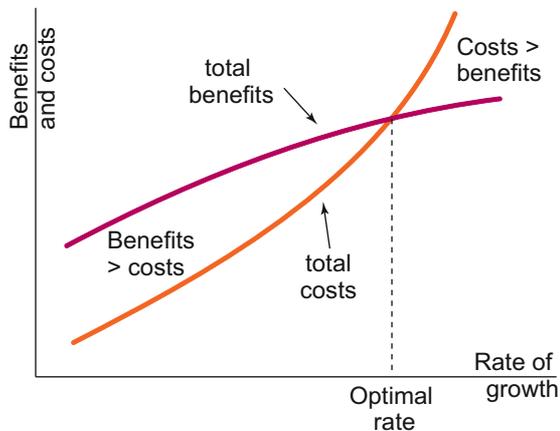
This brings us back to the concept of **sustainable economic growth** – a rate of growth which can be maintained without creating other significant economic problems, especially for future generations. There is clearly a trade-off between rapid economic growth today, and growth in the future. Rapid growth today may exhaust resources and create environmental problems for future generations, including the depletion of oil and fish stocks, and global warming.

The **sustainability** concept is wider than environmental sustainability. About ten per cent of the world's population lives on less than \$2 per day. If those people are to share in future economic progress, they must have similar opportunities to those on offer in Australia. The United Nations estimates that nearly 500 million new jobs are needed in the next 15 years to employ labour force entrants. Many workers are informally attached to the labour force, often meaning their jobs are poorly paid. Economic sustainability in the future means that people should be able to find 'decent' jobs which fund their needs and support others in their community.

The higher levels of material welfare that we enjoy as a result of growth have been associated with **materialism** – where people measure their welfare by the number of material possessions they own, and believe that more money, a better job and higher status and more 'things' enhance their wellbeing. This is not necessarily the case. People may have more material possessions, but they do not of themselves satisfy deep or long term wants. Traditional societies valued collectivism and conformity, where rules and convention were important. By contrast, materialism breeds individualism and even the risk that the things we own end up owning us!

Similarly, high rates of economic growth are associated with social problems such as crime, stress-related diseases, suicide, loneliness and the weakening of the family unit. Perhaps these problems are, to some extent, associated with the pursuit of materialistic goals. Economic growth is associated with a shift of people from rural to urban areas, because jobs shift from agriculture to manufacturing and services. This has led to a rural urban divide, often described in Australia by the decline of rural towns and higher population in urban areas. Urban sprawl and congestion are amongst the problems facing Australia in the next twenty years.

Figure 7.8 The optimal rate of growth



The model shows that the benefits of growth rise quite quickly at first, then level off as living standards rise. The costs of growth are initially low, but then increase because the opportunity cost of resources rises. The optimum rate of growth occurs at the intersection of the two lines. Up until this point, the community's standard of living still rises if the rate of growth increases. If the rate of economic growth exceeds the optimal rate, costs of growth exceed its benefits.

The issue is not whether economic growth should be an objective in our economy or not. Rather, the task is to suggest an appropriate rate of growth, in recognition of the fact that growth has both benefits and costs. If the community wants the benefits associated with economic growth, they have to be willing to bear the costs that growth brings. Figure 7.8 illustrates this 'optimal rate' concept. Initially, the total benefits of growth to an economy are greater than the total costs of that growth. But the benefits of growth rise at a decreasing rate, and the costs of growth increase at an increasing rate.

The intersection of the two curves indicates an **optimal rate of growth**. Up until this point, the community's standard of living rises if the rate of growth increases. If the rate of economic growth exceeds the optimal rate, the costs of growth exceed the benefits. The problem in applying this model is the difficulty in quantifying the benefits and costs to which it refers. As a result, it is difficult to apply the principles of positive economics in deciding what an optimal rate of growth might be. There are many normative questions about what 'should' be.

Review quiz

1. *List three benefits associated with economic growth. Explain one of them.*
2. *List three of the costs associated with economic growth. Explain one of them.*
3. *What does the phrase 'sustainable economic growth' mean?*
4. *Explain why the total benefit and total cost lines in figure 7.8 are both curved.*

8 The business cycle



Learning objectives

In this chapter, you will learn about

- *the concept of the business cycle*
- *the phases of the business cycle and the characteristics of each phase*
- *indicators of economic activity*
 - *leading indicators - share prices, building loan approvals, new employment vacancies, business and consumer confidence, stock/inventory levels*
 - *coincident indicators - retail sales, new car registrations*
 - *lagging indicators - unemployment rates/levels, inflation rate*

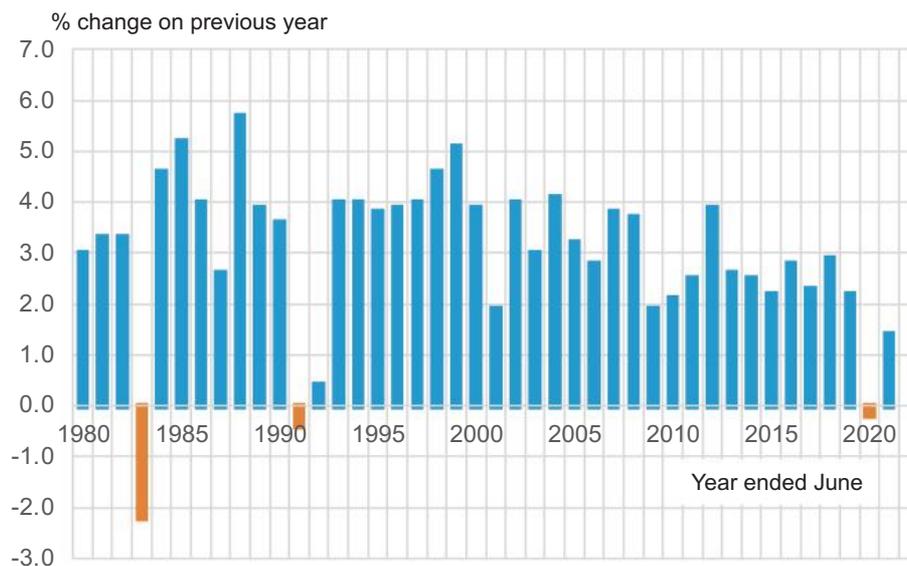
A country's potential output (GDP) will grow over time as a result of population growth; growth in the factors of production such as the labour force and capital stock; as well as improvements in the quality of resources, reflected by increases in productivity. Actual GDP however, changes in an unpredictable and irregular fashion - sometimes economic activity surges and at other times it slows to a trickle and can even fall. The heart of macroeconomics is focused on understanding what causes this fluctuation in economic activity, otherwise known as the business cycle.

In real terms, the Australian economy has grown by a factor of six since 1980 – an average rate of growth of 3.1 per cent. In the period since 2000 the annual average growth rate has been slower – around 2.7 per cent. Figure 8.1 illustrates annual rates of economic growth for Australia between 1980 and 2021. In ten of the years covered by the graph, growth rates exceeded 4 per cent p.a; in 24 years growth was between 2 and 4 per cent; and in six years growth was below 2 per cent. Over the forty-one year period, the Australian economy experienced just three years in which the economy contracted (1983,1991 and 2020). This means that real GDP actually fell, which is shown in the graph as negative rate of economic growth. The recent recession of 2020 ended Australia's longest period of economic expansion and was caused by the global Covid-19 pandemic.

8.1 The business cycle

The business cycle refers to fluctuations in the level of economic activity over time. The main economic indicator that reflects changes in economic activity is real gross domestic product (real GDP). The Australian economy grows on average by around 3 per cent each year - its long-term growth rate. This reflects the trend growth in the

Figure 8.1 Australia: annual growth rate in real GDP



Source: ABS Australian National Accounts Ref period June 2021. Table 1

labour force and in labour productivity. The concept of a 'business cycle' refers to the expansion and contraction in economic activity that occurs around this long term growth rate. The business cycle is typically measured in two ways:

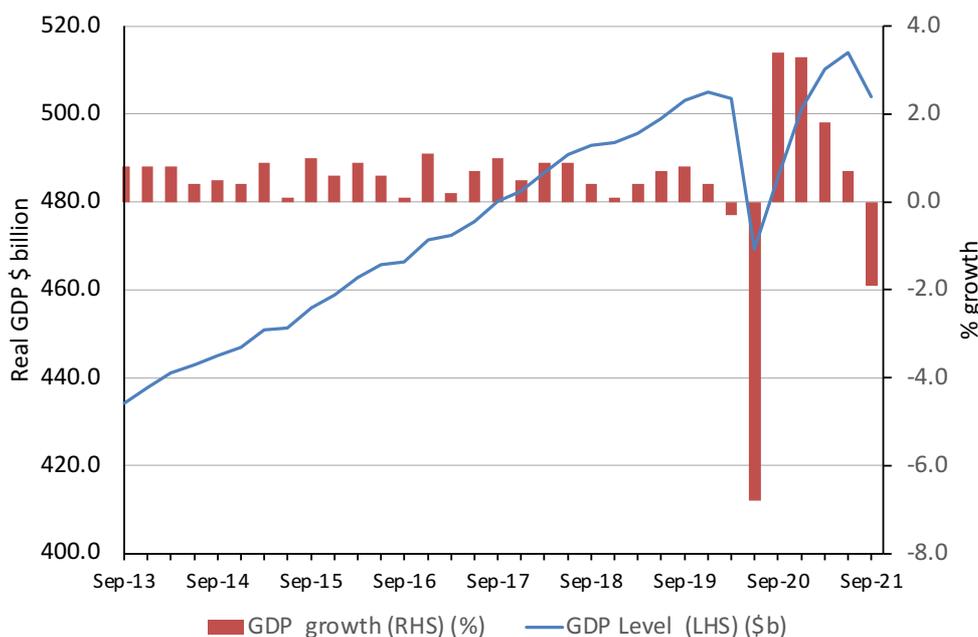
- (i) by measuring the growth rate of real GDP over time
- (ii) by measuring the change in the level of real GDP over time

Figure 8.2 takes a closer look the quarterly change in real GDP for Australia since September 2013. The line graph (LHS) shows the change in the level of real GDP from one quarter to the next. From Sept 2013 to Dec 2019 real GDP increased along a linear trend - typical of a long expansion. Notice that the column graph (RHS) shows the small positive growth rates for each quarter - ranging in value from 0.1 to 0.8 per cent. This long upward trend in real GDP came to an abrupt end in the first two quarters of 2020. In the June quarter, real GDP fell from \$503 billion to \$469 billion - a decrease of 6.8%! The economy then recovered, with real GDP climbing for the next four quarters, before falling again in the September quarter 2021.

Typically, the business cycle is described as having two phases and two turning points through which an economy travels:

- expansion phase
- upper turning point (peak)
- contraction phase (recession)
- lower turning point (trough)

Figure 8.2 Quarterly GDP



Referring to the Australian business cycle in figure 8.2:

- the economy is in expansion from Sept 2013 to Dec 2019
- reaches the upper turning point in Dec 2019
- the economy is in contraction (recession) from Mar - June 2020
- reaches the lower turning point is the June qrt 2020
- the economy enters another expansion from sept 2020 - June 2021

A generalised diagram of a symmetrical business cycle is shown below in figure 8.3. This depicts a regular fluctuation in economic activity with phases of similar length and amplitude. Actual business cycles, however are quite irregular, with expansions lasting much longer than contractions.

• **Expansion**

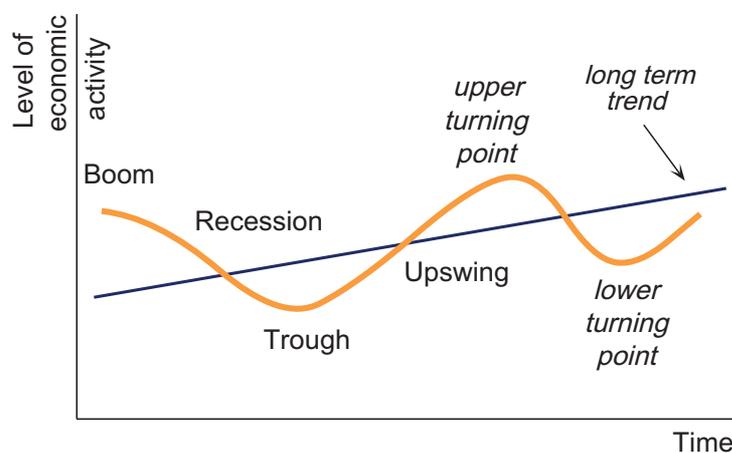
An expansion is a period during which real GDP increases. This means that the rate of growth in real GDP is positive. An expansion is the phase between a trough and the peak of the cycle. Expansions are typically much longer than contractions. For example, the Australian economy was in an expansion phase from 1991 to 2020 - a period of 29 years! During an expansion economic activity increases - both production and employment rise. Consumption and investment both increase during an expansion resulting in rising real incomes and living standards. Expansions are typically associated with rising share prices and house prices.

• **Peak (boom)**

The boom is the upper turning point of the business cycle. It marks the end of the expansion phase and the beginning of the contraction. At the peak or boom of the cycle the rate of economic growth and the general level of economic activity is above average. There are many characteristics of a boom, such as high levels of consumption

Figure 8.3 The business cycle

The cycle describes two phases - the expansion and contraction. The 'turning points' of the cycle are the peak (boom) and trough. The long term growth trend shows the expected path of economic growth over time determined by aggregate supply factors. The ups and downs of the business cycle are related to changes in the level of aggregate expenditure from year to year.



Calculating an economic growth rate

Calculating the GDP growth rate for June quarter, 2021	
Method 1	rate = $\frac{\text{GDP (June, 2021) - GDP (March, 2021)}}{\text{GDP (March, 2021)}} \times 100$
	rate = $\frac{513.9 \text{ bn} - 510.3 \text{ bn}}{510.3 \text{ bn}} \times 100 = 0.7\%$
Method 2	rate = $\frac{\text{GDP (Dec, 2019)}}{\text{GDP (Sept, 2018)}} - 1 \times 100$
	rate = $\frac{513.9 \text{ bn}}{510.3 \text{ bn}} - 1 \times 100 = 0.7\%$

Two methods for calculating the quarterly economic growth rate are shown. To calculate an annual rate, first add the four quarters in each of the financial years, then apply the formula to the annual totals. For the year June 2020 to June 2021, the annual rate of growth was 1.4%. GDP was recovering from Covid-19!

expenditure; very high levels of business and household confidence; and low levels of cyclical unemployment. A peak is normally associated with high levels of demand inflation, as excess demand for resources, especially labour, cause wages to rise which then feed into higher price levels.

- **Contraction (recession)**

The contraction phase is a period when the level of real GDP actually falls or the growth rate of real GDP is negative. Economists will often define a recession as two consecutive quarters of negative economic growth. This means that real GDP has fallen for 6 months or more. A key indicator of a recession is a sharp rise in the unemployment rate. A recession is normally short-lived usually lasting for less than a year. A deep or prolonged contraction lasting more than a year is called a depression. The typical internal causes of a contraction include the slowdown in household consumption once the cycle reaches its peak and falling levels of investment as businesses stop buying new capital equipment at the end of the expansion. Lower investment translates into lower output and income. A contraction or downswing will often happen quickly and be associated with a correction in the sharemarket as share prices plunge. In 2020, the global Covid pandemic provided an excellent example of a negative shock which resulted in Australia's first recession since 1991.

- **Trough**

The trough is the bottom turning point of the cycle, characterised by low levels of spending and high levels of cyclical unemployment. The labour force participation

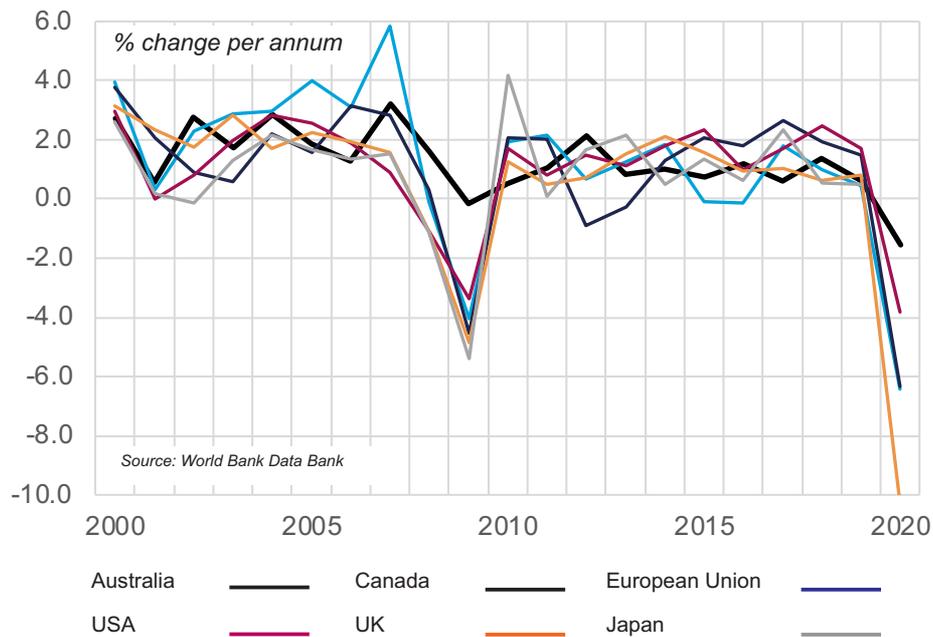
rate is very low because people feel they have less chance of finding employment. Many businesses are in 'survival' mode. With low demand, prices may fall resulting in a period of deflation. Bankruptcies are likely to be high. Consumer and business confidence will be at record lows and savings levels may rise as households adjust their spending and borrowing behaviour. A trough is a turning point because at some stage, spending will begin to rise - firms will need to replace or update worn out capital equipment increasing business investment. which means new investment spending starts to flow into the business sector.

All economies are subject to the irregular fluctuations in economic activity and growth. This is especially true in an increasingly globalised and interconnected world. The impacts of events in one part of the world will quickly be transferred around the globe. In the 1970s, it was often said that if the US economy 'sneezed,' Australia would catch a cold. This has now been superseded by the saying that if China sneezes, Australia will catch pneumonia! Figure 8.4 illustrates the annual change in real GDP for six developed economies between 2000 and 2021. Note the broad similarities between each economy's business cycle.

Our discussion of the characteristics of the business cycle focussed on the economic events that would typically occur in each phase. Many cycles are influenced by non-economic events. For example:

- Australia's short downturn in 2000 was not as severe as it was in other countries – this may have been due to the building and tourist spending associated with the staging of the Olympics in Sydney.

Figure 8.4 International business cycles



- A severe drought in the eastern states was in part responsible for slow growth in the early 2010s.
- The Global Financial Crisis (GFC) in 2008-2009 started with dramatic events such as the bankruptcy of Lehman Bros (a huge US investment bank) in September, 2008, but it was really a reaction to regulation and policy errors that encouraged excessive risk taking by banks and investors. The recovery from the GFC was very long because of the uncertainty it created in financial confidence for several years.
- The onset of the Covid-19 pandemic in February 2000 had a dramatic effect on the economy, as indicated by the size of the GDP contraction in 2019-20. The anticipated recovery from the recession was interrupted again in mid-2021 when the Delta variant of the virus caused shutdowns in NSW and Victoria.

These events are sometimes called ‘exogenous events’ because they are often caused by a ‘non-economic’ event. Examples of exogenous events include drought, flood, earthquake, terrorism and war – they influence macroeconomic activity because of their impact on confidence and the way they disrupt business activity.

Review Quiz

1. **Define the term ‘business cycle’.**
2. **Describe the characteristics of the expansion phase and the contraction phase of the business.**
3. **Explain the two turning points of a business cycle.**
4. **Explain the cause of Australia’s recession in 2020.**
5. **Outline how to calculate the economic growth rate between any two years or quarters.**

8.2 Indicators of economic activity

Like all models, the business cycle model simplifies reality. We would never expect the actual path of economic activity to follow the smooth, predictable pattern implied by figure 8.3. Households, businesses and the government want to know where the economy ‘is’ on the business cycle at any point in time, however. This helps to make good economic decisions. Company managers want good information to help them answer questions such as ‘should I hire more staff?’; ‘should I invest in a new warehouse?’ or ‘should we spend money on a new advertising campaign?’ Households want to know about employment trends, price levels and interest rates. The government and policy makers are interested in current trends in the labour market, prices, and household spending patterns, to name a few. Answering the ‘where are we’ question is a complex task involving the collection and interpretation of a wide range of economic data that ‘indicates’ what is happening in the overall economy. Indeed, this is quite a large ‘industry’ in developed economies.

The headline indicator is the growth rate in Gross Domestic Product (GDP). GDP data is released every quarter (3 months) by the Australian Bureau of Statistics (ABS). Average rates of growth in developed economies are about 3 per cent per annum, so we would expect quarterly growth rates of around 0.7 to 0.8 per cent. Figure 8.2 showed the quarterly GDP data for Australia between 2013 and 2021. The Australian economy was quite 'soft' in 2018 and 2019, with quarterly growth rates averaging 0.4 – 0.5 per cent (implying annual growth around 1.8 per cent). The dislocation brought about by the onset of the coronavirus pandemic in February 2020 resulted in negative growth rates in both the March and June quarters, and the annual rate of growth for the 2021 financial year was -0.2 per cent. The rate of growth was quite strong for the next three quarters (3.4, 3.3 and 1.8 per cent respectively), reflecting the end of some lockdowns and the bounceback from the severe contraction in the June 2020 quarter. The onset of the Covid-19 Delta variant in mid 2021, however, resulted in long periods of lockdown in Victoria and NSW, an increase in unemployment and a contraction in GDP. The RBA forecasts that the economy will rebound from December 2021.

Types of economic indicators

The term 'economic indicators' covers a very large field of data and information. Broad indicators such as GDP, inflation and unemployment give a general overview of the state of the economy. Partial indicators help to complete the picture by drilling down into sectors of the economy. The indicators are often classified according to whether they are 'leading', 'coincident', or 'lagging'. These terms refer to the timing of the relationship between changes in individual indicators and changes in the general level of economic activity.

Leading indicators change before a direction becomes evident in the rest of the economy. They therefore predict trends in economic activity. Examples of leading indicators include building approvals; share prices; levels of inventory held by firms; new employment vacancies; levels of business confidence; and consumer sentiment. Leading indicators tend to reflect the expectations of households and firms about the future of the economy.

Coincident indicators are those that appear to move in line with the level of economic activity, such as manufacturing output; production of building materials; sales of consumer durables; retail sales; interest rates and changes in real GDP. To some extent even coincident indicators are 'lagging' because the time taken to collect, prepare and publish the data can be one to three months.

Lagging indicators are not expected to show any change until after trends in the rest of the economy have been confirmed. These indicators appear to change in response to developments that occurred some time in the past. For example, businesses generally only shed labour when they are sure that levels of spending in the economy are insufficient to cover the costs of staff. In the expansion phase, when firms need more staff, it can take some time to make the hiring decision; to advertise vacancies, and employ the right people. The same sort of time lag applies to household decisions about discretionary purchases and their debt and savings levels.

Figure 8.5 Examples of economic indicators

Leading indicators	Coincident indicators	Lagging indicators
Share prices Building approvals Levels of stock (inventory) held by retail firms Manufacturers' new orders Business and consumer confidence Consumer expectations New employment vacancies New business startups	GDP Manufacturing output Sales of consumer durables Production of building materials Retail sales Job advertisements Motor vehicle sales Money supply Capacity utilisation	Interest rates Consumer debt Unemployment rate Bankruptcies Inflation rate (CPI)

Where can information about economic indicators be found? Many institutions, both public and private, collect and publish economic data, including:

- The Australian Bureau of Statistics (ABS), which releases economic data on a daily basis.
- The Reserve Bank of Australia (RBA), which maintains economic and financial data, and publishes a Chart Pack which is updated monthly.
- The Department of Foreign Affairs and Trade (DFAT), which publishes trade and investment data which is often updated monthly.
- The Department of Agriculture, Water and the Environment (ABARES)
- Many of the major banks have economic departments that publish economic data.
- Industry bodies in retail, building and construction; real estate; mining and tourism sectors.

Figure 8.6 shows some examples. Careful collection of economic data enables economists to understand current trends, and make forecasts about future conditions. The publication of this data is often delayed, however, because it takes time to collect and compile the statistics. Like all statistics, economic indicators need to be interpreted with care. This could be the reason behind the joke about asking two economists for a prediction and you will get five different answers!

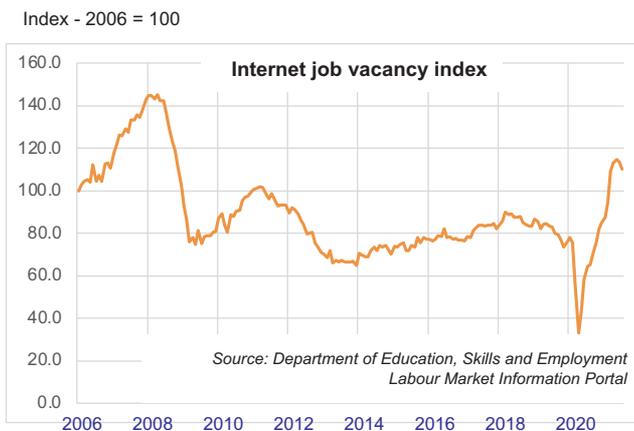
Review Quiz

- 1. Why are economic indicators important?**
- 2. Distinguish between the three types of economic indicators.**
- 3. Explain why it is difficult to predict the path of economic activity.**

Figure 8.6 Economic indicators

The top panel shows the Department of Education, Skills and Employment's Internet Vacancy Index. The index is based on a monthly count of newly lodged job advertisements on online job search sites such as SEEK, and JobSearch during the month.

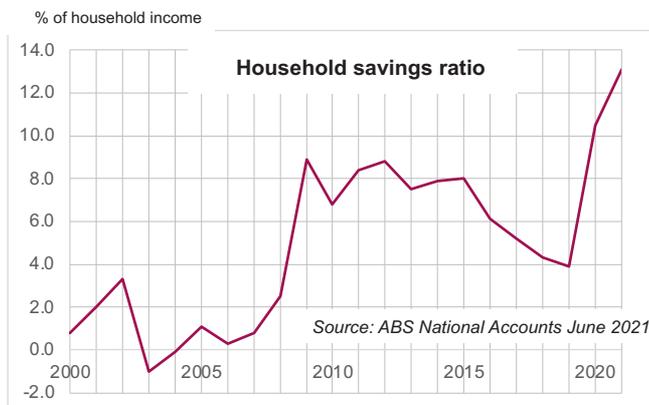
As we would expect, job vacancies rise in periods of growth such as 2006-2008, and fall in weaker growth periods such as the GFC; 2011-2015 and the Covid-19 period in 2020.



The graph in panel B shows hours worked in the market sector (i.e. non-government) between 2000 and 2021.



Panel C illustrates the household savings ratio - the proportion of household income that households save. This reflects attitudes about the current state of the economy and the job market. This indicator is countercyclical - savings rise when growth is weak, and fall when growth is strong. Note the impact of Covid-19 on household savings.



Boom, bubble and bust

The general explanation of the business cycle has already been outlined in this chapter. In this section, we describe some of the more spectacular booms and busts that have dotted economic history. They have been connected to demographic changes such as migration and opening up of new land; to periods of building infrastructure such as railways; and to technological change such as mass production and information technology. The term 'bubble' is often associated with these periods as there is rapid escalation of market value of assets, followed by a quick decrease that is sometimes referred to as a "crash".

In the 1840s, for example, massive investment in rails and rolling stock (trains and carriages) extended the rail network across the United Kingdom. The new railways moved people and goods much faster than the horse and carriage or canals, and the promise of future profits brought considerable optimism. Railroad stock prices rose by 62 percent from 1843 to 1845, then collapsed.

In the United States, the 1920s saw massive investment in new industrial technologies such as electricity, automobiles (General Motors and Ford), communications (public radio), and petrochemicals. The Roaring Twenties (as they became known) is often associated with social and lifestyle changes such as jazz, flappers, mass radio and model T Fords. Much of the new investment was financed by the issue of equities (shares), sparking a boom in investment trusts and commercial banks. Around 1928, the rush to invest overtook economic fundamentals and became a speculative bubble. The Wall St crash of October 1929 was the hallmark event of the Great Depression, but a series of bank panics did the real damage – deflation, company failure and unemployment (exceeding 20% in the US; higher in Australia). Some believe the Depression really only ended when World War II started.

A more recent boom, bubble and bust came when Internet technology became commercially available in the 1990s. The companies that provided the backbone for the Internet and computing equipment such as Intel, Cisco, Microsoft, Apple and Oracle, drove growth in the technology sector, but many startups went

public with a 'blue-sky' idea, but no business plan, product, or track record of profits. The optimism and euphoria that swept technology stocks eventually came to an end in March 2002. The high tech Nasdaq index, which had risen five-fold between 1995 and 2000, fell 75 per cent!

Each of these booms brought huge economic and social changes we now know as the railway, manufacturing and ICT industrial eras. A number of booms and busts have also been associated with developing land and natural resources. Dutch "tulip mania" (1634 to 1637) began when the bulbs were first imported from the Far East and became a luxury item in the gardens of the wealthy. For a brief period, bulbs traded for as much as the annual wage of a tradesman. Trading was like a futures market – wealthy merchants (in the main) bought the right to own a tulip in bloom (which lasted a week)! Although claims were made that people lost fortunes, most losses were 'on-paper' as many buyers eventually refused to meet obligations to pay the price they had agreed on.

Prosperity in Europe in the mid-1830s fueled confidence and an increased willingness to take risky foreign investments. Investment and speculation in cotton, the land on which it was grown, and canals took place in the US, but more supply and better transport to markets caused prices to collapse. This was disastrous, as many loans were secured by cotton prices. The result was a stock market crash and banking panics in 1837 and 1839, which led to a number of US states defaulting on their sovereign debt, and one of the most serious recessions in US history.

Prior to the 1920s, Florida was regarded as a farming state by Americans. After World War I, middle class Americans were growing wealthier, had automobiles in which to travel, and generally equated success with materialism. Attracted by easy credit, glamorous advertisements, and a sub-tropical lifestyle, many rushed to buy land in the southern state, often without seeing that it was swampy and low-lying. Land developers were building new cities with luxury resorts and facilities such as hotels and pools. The state government borrowed considerable amounts of money at high interest rates to build facilities to attract the expected growth of new residents and tourists. Florida was a place to holiday,

a place to have fun, a place to make money. Until 1925, that is. Prices had risen so far that many new residents could no longer afford to live there. For sale signs attracted no buyers. A hurricane in 1926 was the final straw for many developers, and the boom was over as fast as it had started.

Many bubbles were facilitated by lax prudential standards. The 1880s property boom in Australia was financed by rapid expansion in bank lending. The increased competition from the new 'land banks' in the 1880s weakened bank standards. Major banks at the time issued their own bank notes, so if confidence fell the worth of their money as a means of trade and a store of value also fell. Public confidence in financial institutions faltered, starting a banking crisis. Real GDP fell by 17 per cent in 1892-1893. Only 9 of 28 banks in operation in 1890 survived. There was an abrupt collapse of private investment in the pastoral industry and urban development, and a sharp pullback in public infrastructure investment.

The Global Financial Crisis of 2007-09 was another illustration of why prudential standards are crucial in financial markets. The US economy had been strong since the mid-1990s, with growth, low unemployment and low inflation fueling confidence and a willingness to invest. Expectations that prices would continue to rise fuelled borrowing for real estate. In the United States, many 'sub-prime' loans were issued without 'stress-testing' applicants' ability to repay if conditions changed.

Additionally, banks bundled mortgage-backed securities and other derivatives to investors, but these were a mix of low and high risk securities. Highly leveraged borrowers came under pressure from mid 2006 as house prices leveled off (reducing owner equity and tripping foreclosure) and some mortgage backed securities failed. Excessive borrowing happened in other parts of the world, notably Iceland, Spain and Ireland. Financial market panic began in September, 2008, with everyone wanting to offload investments to non-existent borrowers.

The crisis spilled over to other countries, and a depression such as that of the 1930s was only averted because governments funded rescue packages.

The recession associated with the Covid-19 pandemic also featured panic in early 2020 as the extent and impact of Covid-19 was unknown and governments around the world scrambled to shut down parts of their economy to try to limit the spread of the disease. The economic effects will reverberate for some time (see also chapter 13).

As we have described, cycles have been a feature of the economy for years. In the main, they have been less spectacular than those outlined above. The United States National Bureau of Economic Research (NBER) identified 34 business cycles between 1854 and 2020, with an average duration of 56 months. In the United Kingdom, there have been 22 cycles since 1870. Australia's Melbourne Institute has identified twelve cycles between 1960 and 2020, with an average duration of 45 months.

In general, booms and bust were more 'spectacular' before World War II than after, for two reasons: firstly, booms were often related to the overshooting of confidence and investment that accompanies new technology, opening up land, new trade routes or new industries, and secondly, governments didn't intervene in macroeconomic management at all until the 1950s (Keynesian economics). Better economic management and the availability of economic data have generally meant smaller booms and fewer busts.

Current senior secondary students, however, have now experienced two major recessions in their lifetime, and can probably expect another in the next 20-30 years (apart from the 'normal' business cycle). Perhaps the next boom and bust will be associated with cryptocurrency, batteries, electric helicopters, or a rush to overcome climate change! If they occur, the chances are that they will again be a mix of market fundamentals, irrational exuberance, and regret.

9 Inflation



Learning Objectives

In this chapter, you will learn about

- *the concept and measurement of inflation*
- *the distinction between headline and underlying inflation*
- *types of inflation*
 - *demand pull*
 - *cost push*
- *the effects of inflation*

9.1 The concept and measurement of inflation

Economists define **inflation** as a persistent and appreciable rise in the general or average level of prices. In other words, the term describes noticeable price increases that occur over time, across a range of goods and services. In developed economies, moderate inflation is the norm rather than the exception. This is because inflation is a pro-cyclical variable - it usually increases as the level of economic activity increases and is normally present when the economy is in an expansion phase of the business cycle. In Australia, levels of inflation have been less than three per cent per annum since the early 1990s, perhaps leading to a view that it is not a significant problem. We should remember, however, that inflation averaged 8 per cent p.a. through the 1970s and 1980s – levels that had significant consequences for our economy. The opposite of inflation is **deflation** - this occurs when the general level of prices falls. This is usually associated with an economy that is contracting or in a recession phase of the business cycle.

The measurement of inflation

The most familiar measure of the level of inflation in Australia is the **Consumer Price Index (CPI)**. The CPI measures changes in the prices of a **basket** of goods and services (a sample) bought by Australian households from one quarter to the next. The list of items covered in the CPI basket “ranges from steak to motor cars, and from dental fillings to restaurant meals” (ABS - A Guide to the Consumer Price

Group	Weight – contribution to CPI (%)		
	2011	2018	2020
<i>Year of weight update ></i>			
Housing	22.3	23.2	24.1
Food and non-alcoholic beverages	16.8	15.8	17.4
Transport	11.6	10.5	10.2
Alcohol and tobacco	7.0	7.4	8.9
Furnishing, household equipment and services	9.1	8.9	8.8
Recreation & culture	12.6	12.6	8.7
Health	5.3	5.7	6.3
Insurance and financial services	5.0	5.9	5.1
Education	3.2	4.3	4.7
Clothing and footwear	4.0	3.3	3.3
Communication	3.0	2.6	2.5

Sources: ABS, 2020. *The 2020 annual re-weight of the Australian Consumer Price Index; Introduction to the Consumer Price Index Weight Update, 2018* (ABS Cat. no. 6470.0.55.002); and ABS Cat 6431.0 – *Consumer Price Index, Historical Weighting Patterns, 1948-2017*.

Index: 17th series). The items are classified into eleven major groups, 33 subgroups, and 87 classes of expenditure. To construct the index, the ABS records about 900,000 separate prices during each quarter.

A key point to understand is that price changes of items in the basket don't have equal importance! The average person would probably consider a 10 per cent rise in the price of fuel to be more significant for their household budget than a 10 per cent rise in the price of hire cars! Thus the ABS attaches a **weight** to each commodity in the CPI basket in order to reflect its importance in the pattern

of expenditure in an 'average' household. The weights are based on the Bureau's Household Expenditure Survey. As shown in the sidebar, spending on the housing group currently accounts for about a quarter of an average family's expenditure. This includes items like rent, new home purchases, property rates and utility charges.

The ABS reviews the weights of items in the basket in December every year to ensure they are an accurate reflection of 'average' household spending patterns. Weights rise or fall depending on changes in consumer preferences and their reactions to price changes. The changes to some weights in December 2020 were larger than normal, reflecting changes in household spending patterns during the Covid-19 period. For example, spending on items in the housing group rose as people spent on household renovations when they were in lockdown or work-from-home periods. Spending on recreation and culture fell markedly because travel was restricted and recreation venues such as theatres and stadiums were closed or restricted to smaller attendances. The lower weight for the transport class reflected less commuting to work and other restrictions on travel. Many of these changes will be reversed as and when household spending characteristics revert to their 'pre-Covid' patterns.

To explain how index numbers are calculated, a hypothetical index based on just four items in the food group has been constructed in figure 9.1. The weight of each item is determined, as explained previously, by the importance of type of product to an 'average' household. In our example, bread is more important to households, so it is weighted at 40, whereas the weight attached to chocolate is 10.

The weight is then multiplied by the price of the item ($W \times P$) to calculate how much the household would have spent in a period of time. Total expenditure on all items in each period is then calculated (\$416 in period 1 and \$422 in period 2). Period 1 is called the 'base' period, and is thus allocated the index number 100. The base period is that to which others will be compared. To calculate the price index for period 2, the total household expenditure for that period (\$422) is expressed as a proportion

Figure 9.1 Inflation calculations - index numbers

Item	Weight	PERIOD 1 (Base)		PERIOD 2	
		\$ Price	W x P	\$ Price	W x P
Bread	40	3.20	\$128.00	3.40	\$136.00
Fish	30	8.00	\$240.00	7.80	\$234.00
Lettuce	20	1.15	\$23.00	1.20	\$24.00
Chocolate	10	2.50	\$25.00	2.80	\$28.00
TOTAL	100		\$416.00		\$422.00
		PRICE INDEX		100.0	101.4
				Rate of inflation	1.4%

of expenditure in the previous period (\$416). Hence the index number for period two is 101.4 ($\$422/\416). Note that the index is a summary measure for the four items in the food basket. The rate of inflation is simply the rate of change in the price index from one period to another. In our example, the rate of inflation is 1.4 per cent ($101.4/100$).

Figure 9.2 shows Australian CPI data for the period 2012 to 2021, as at June each year. The **rate of inflation** (rate of change of prices) for each year is calculated from the CPI, using either of the methods shown in the right panel of the figure. The CPI stood at 114.4 in June 2020. By June 2021, the CPI had risen to 118.8. The 2021 figure, as a proportion of the 2020 figure, was 103.85, so the rate of inflation for the year 2020-2021 was 3.85 per cent (or 3.8 per cent rounded to one decimal place). Quarterly rates of inflation are calculated in the same way as the annual rates (by substituting the word ‘quarter’ for ‘year’ in the formula). The annual rate is the sum of any four consecutive quarterly rates. We could also calculate the percentage rate of price changes over the whole period – 2021 prices are 18.3 per cent higher than the base period of 2011-2012.

Headline and underlying measures of inflation

The CPI is the ‘**headline**’ measure of inflation in Australia – the broad measure of changes in the cost of purchases made by wage and salary households in capital cities. Figure 9.3 reports inflation rates by CPI group over a five year period. Note that price movements across the groups don’t move in a uniform manner – prices in some groups rise, yet others fall. Prices in the communications group, for example, fell, perhaps because technological change has cut the costs of phone calls and mobile services, or because markets for those goods are more competitive.

Figure 9.2 Inflation calculations – the rate of inflation

Year ended June	CPI
2012	100.4
2013	102.8
2014	105.9
2015	107.5
2016	108.6
2017	110.7
2018	113.0
2019	114.8
2020	114.4
2021	118.8

Calculating the annual inflation rate for 2020-21	
Method 1	rate = $\frac{\text{CPI (2021) - CPI (2020)}}{\text{CPI (2020)}} \times 100$
	rate = $\frac{118.8 - 114.4}{114.4} \times 100 = 3.85\%$
Method 2	rate = $\frac{\text{CPI (2021)}}{\text{CPI (2020)}} - 1 \times 100$
	rate = $\frac{118.8}{114.4} - 1 \times 100 = 3.85\%$

Source: ABS Consumer Price Index, Australia. June 2021

Figure 9.3 Recent Australian inflation data

Group	% price increase 2016-17	% price increase 2017-18	% price increase 2018-19	% price increase 2019-20	% price increase 2020-21
Food and non-alcoholic beverages	1.9	0.3	2.4	4.1	0.7
Alcohol and tobacco	5.9	7.8	5.9	8.4	6.7
Clothing and footwear	-1.9	-2.0	0.2	0.5	0.3
Housing	2.4	3.1	0.5	0.1	-0.2
Furnishings, household equipment and services	0.0	-0.5	-0.4	-9.8	16.9
Health	3.8	3.4	3.0	0.9	4.8
Transport	2.1	5.2	1.7	-7.5	10.7
Communication	-3.8	-4.2	-4.4	-3.6	-1.3
Recreation, sport and culture	-0.1	0.4	2.2	-0.3	2.5
Education	3.3	2.7	2.8	-1.0	3.7
Insurance and financial services	2.1	1.5	0.9	-1.7	0.6
All groups	1.9	2.1	1.6	-0.3	3.8

Source: ABS Cat. 6401.0 Consumer Price Index, Australia

Inflation Measures	% YoY 2016-17	% YoY 2017-18	% YoY 2018-19	% YoY 2019-20	% YoY 2020-21
Headline CPI	1.9	2.1	1.6	-0.3	3.8
Seasonally adjusted	1.5	1.8	1.5	-0.5	3.7
Trimmed mean	1.8	1.9	1.6	1.2	1.6
Weighted median	1.8	1.9	1.3	1.3	1.7

Source: ABS: Consumer Price Index, Australia

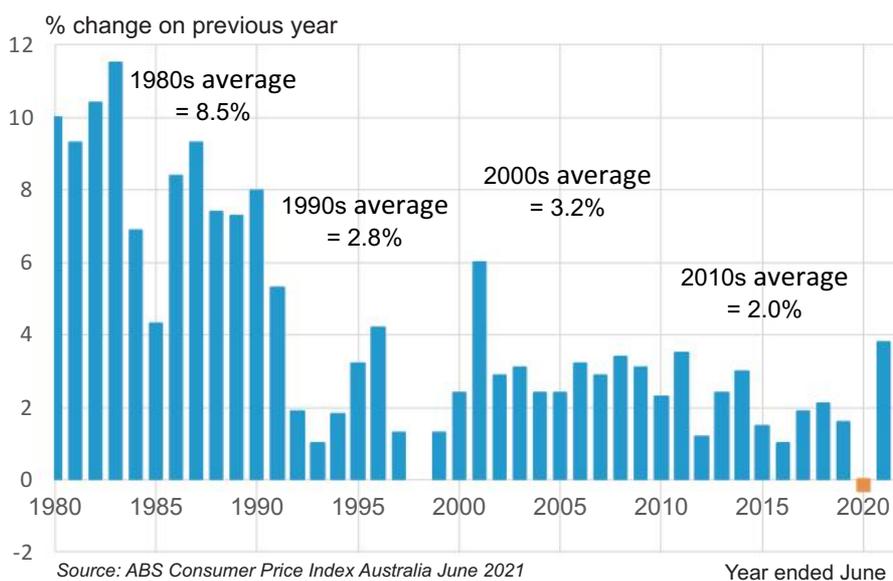
The ABS adjusts the headline data to account for seasonal price movements (such as fruit and vegetables) and for volatile prices such as automotive fuel prices and housing costs. An example of an irregular movement is the 7.1 per cent rise in automotive fuel prices in the September quarter of 2021, reflecting higher demand due to the recovery from the Covid-19 recession. The **underlying** measures give a better picture of the 'true' rate of inflation. Apart from adjusting for seasonal and volatile price movements, the ABS calculates trimmed mean and weighted median measures. To calculate the **trimmed mean**, the ABS arranges all the price movements from largest to smallest then 'trims away' the top 15% and the bottom 15%. Trimming the price change extremes removes the impact of irregular price movements. The **weighted median** is the rate of price change of the item at the middle of the price changes in the CPI basket (the 50th percentile by weight).

The lower panel of figure 9.3 suggests that there is usually not much difference between headline and underlying results. The larger difference in the last two years of the data reflect the unusual changes in prices during the Covid-19 period. For example, fuel prices fell from a high of \$1.60 per litre early in 2020 to \$0.95 in May, levelled off around \$1.20 for the rest of 2020, then rose to record levels around \$1.75 in November, 2021.

There are some other points to be aware of when interpreting CPI data. Firstly, the CPI only reports price movements in metropolitan areas (capital cities). Secondly, The CPI is not regarded as a ‘true’ cost-of-living index because it does not reflect changing consumer preferences or the substitutions that consumers make from day to day in response to relative price changes (perhaps consumers buy more chicken and less beef if the price of beef rises during a drought). The CPI does not account for changes in the quality of goods over time, and is thus likely to overstate price increases. That said, the CPI is an important macroeconomic indicator and a key consideration in decisions about contract prices, welfare payments such as pensions, and the formulation of government economic policy. The ABS publishes other price indices report price changes in more specific groups of goods and services, examples being the producer price index (PPI), inputs used in building (BPI), the export price index (XPI) and the import price index (MPI).

Figure 9.4 shows the rates of inflation in Australia over the period 1980-2021. The numbers are annual averages. Apart from two years (1998 and 2020), the rate of inflation was a positive number. The inflationary period of the 1980s was brought to a halt by the early 1990s recession. Since then, Australia has experienced mild inflation. Indeed, the possibility of **deflation** (falling price levels) was a topic of interest amongst economic commentators between 2017 and 2019.

Figure 9.4 Inflation: 1980-2021



Through 2021, there was much debate about whether the lift in prices resulting from supply chain pressures associated with Covid-19 would be temporary or long-lasting (see also chapter 13).

9.2 Types of inflation

In this section, we examine two generalised explanations of inflation.

Demand pull inflation

The simple description of **demand pull** inflation is ‘too much money chasing too few goods.’ The reference to ‘too much money’ implies that households and businesses are spending more than they normally would, causing prices to rise as a result of competition for the goods and services that are available.

Indicators that suggest that prices might come under pressure from higher aggregate demand include:

- high levels of consumer confidence
- low levels of spare capacity in key industries
- rising wages that increase disposable income
- high levels of credit use (such as borrowing for household items)
- rises in property or share market asset prices that might cause spending to increase due to the wealth effect (rising spending when households feel that the on-paper value of their assets has risen)

Each of these indicators would tend to ‘bid up’ prices in relevant markets.

Excess demand occurs in both producer and consumer markets. If there is a high level of demand for labour in some industries, for example, the relative shortage of workers forces their prices (wages) up.

Demand pressure is more likely in some sectors of the economy than others. In the mining construction boom of 2011-2014, companies had to pay high wages to attract qualified workers to remote regions. Many workers left their jobs in cities, causing a flow-on of competition for workers, so wages outside the mining sector were also bid up. This doesn’t show up in the CPI data for those years, however, because the Australian dollar appreciated at the same time – imports became cheaper and offset domestic inflation to some extent.

Cost push inflation

Cost push inflation occurs when rising input costs are passed on to consumers, who then pay higher prices for final goods and services. Episodes of cost push inflation can be attributed to events such as:

- rising oil/petrol prices (fuel being a significant cost component in production and distribution)
- rising import prices as a result of depreciation of the currency

Figure 9.5 International inflation rates

World Bank data for 180 countries showed that 22 had negative inflation (deflation) as at mid 2021, and four had rates above 30% p.a. (hyperinflation).

International inflation rates: 2020-21			
Country	Inflation rate (% p.a.)	Country	Inflation rate (% p.a.)
USA	4.3	Indonesia	1.3
Canada	3.3	New Zealand	3.3
France	0.4	Greece	-0.5
Germany	2.8	South Africa	3.0
UK	1.8	Argentina	55.4
Japan	-0.2	Singapore	1.0

Source: Trading Economics

- wages rising faster than worker productivity
- natural disasters such as flood and drought, which sometimes cause shortages of agricultural products or disruption to freight lines

Unanticipated events such as overseas oil refinery disruptions and floods are regarded as 'supply shocks'. Inflation in the 1970s started with a significant oil 'price shock' in 1973, when world oil supplies were constrained because OPEC (Organisation of Petroleum Exporting Countries) decided to limit production. Prices tripled within the space of a year.

The demand pull and cost push explanations outlined above are very generalised. In practice, it can be difficult to distinguish demand pull and cost push instances of inflation. For example, a wage rise will increase the cost of supply for business firms, but it will also increase the income of households, and enable them to purchase more goods and services.

Inflation can also build its own momentum, particularly when households and businesses start to expect that inflation will occur. This occurred in most economies in the 1970s and 1980s, and it took the deep recession of 1991 to 'break the cycle'.

The Covid-19 problems in 2020 saw airports closed and passenger services shut down, leading to a significant reduction in international air freight capacity. At the same time, a surge in e-commerce increased demand for container capacity while

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the global market supply remained the same. The shutdown of ports at the start of the pandemic was difficult to reverse, so the prices of containers quadrupled, and remain high at the time of writing (late 2021). So the uptick in inflation in 2021 is due to both demand and cost pressures. In conclusion, we note that there are many explanations of inflation in economics. Some economists point to the supply of money; others to expectations about what will happen in the future. These are a little theoretical to be considered here.

Review quiz

- 1. Why are goods and services in the CPI basket of goods given a 'weight' ?*
- 2. In year 1, the CPI was 132.4. In year 2, the CPI stood at 136.7. How should the annual rate of inflation be calculated?*
- 3. Why is an 'index' used to compile data about price increases?*
- 4. In what way is the 'trimmed mean' a truer measure of inflation the headline CPI?*
- 5. Describe the causes of demand pull inflation.*
- 6. Give some examples of events that might bring on a period of cost push inflation.*

9.3 The effects of inflation

Most economists consider moderate inflation to be a sign of a healthy economy, because by bringing forward spending it encourages consumption, and because it encourages borrowing as debtors repay loans with inflated money. As figure 9.4 illustrated, inflation has been moderate in Australia (and in the developed world) since the mid 1990s. But inflation can also be a burden on the economy, especially if rates creep above four or five per cent.

Inflation effects everyone because it reduces **real income** or purchasing power (the amount of goods and services that can be bought with an amount of money). An inflation rate of 3 per cent this year means that a dollar will only be able to buy 97 cents worth of goods and services next year.

Inflation affects interest rates, the level of which is important to many households and businesses. Lenders such as banks need to maintain a margin between their cost of funds and the rate at which they lend those funds. This is how they cover their costs and make a profit. If the interest rate was 7 per cent, and inflation was 8 per cent, lenders would in effect be getting a negative return and would thus have no incentive to lend money! Hence, the **real interest rate** (the nominal interest rate minus the inflation rate) must be positive (perhaps by 2-3 per cent to cover costs). So inflation places upward pressure on the nominal interest rate (the interest rates published by the banks). Higher rates are good for savers, but not for borrowers.

Inflation can affect **international competitiveness**. A country's exports are at a disadvantage in relation to overseas competitors when domestic inflation is greater than it is overseas. Assume a buyer in Japan could buy a product from either New Zealand or Australia, and her decision is made on the basis of price (i.e. the quality of the competing products are similar). If inflation levels in New Zealand were 4 per cent p.a., whilst prices in Australia were increasing at 7 per cent p.a., it is likely that over time the buyer will tend to buy from New Zealand, as the price is rising at a slower rate than the Australian product.

It follows that ongoing inflation tends to result in currency **depreciation** (because there is less overseas demand for a country's goods). This has both positive and negative effects, depending on whether we consider exporters (like farmers and miners) or importers (like car dealers or importers of household electrical goods). In the case of exporters, depreciation makes their products appear cheaper for overseas buyers, so we would expect them to sell greater quantities. For importers, on the other hand, depreciation means that one Australian dollar exchanges for less units of an overseas currency. This means the cost of imports will tend to rise, which is inflationary if it is passed on to buyers. The net effect of depreciation on inflation depends upon the relative price elasticities of imports and exports – that is, the responsiveness of buyers to price changes in exports and imports.

Inflation can impact on production decisions throughout the economy. On-going wage inflation may cause **capital-for-labour substitution**, where business owners replace labour with machines (which don't ask for pay rises). Rising costs have been responsible for many structural changes in our economy. As mentioned, there was a significant increase in oil prices in the 1970s which led, amongst other things, to the demise of the traditional large 'family car' as consumers sought greater fuel economy (although average fuel consumption has only fallen by about 2 litres per 100 Km over the period!)

Excessive inflation creates **uncertainty** for decision-makers. A builder negotiating a contract with a homebuyer risks the contract price not covering final building costs when the house is complete in twelve months. Investment decisions are more risky because decision-makers are not certain what prices will be in the future. If inflation leads to higher risk associated with long-term capital expenditure, then it also leads to reduced output and employment opportunities.

By extension, inflation impacts on **economic efficiency** and the level of output produced in the economy. This is explained by the uncertainty which continual price increases bring to productive decisions, and by the possibility that inflation diverts resources away from productive activities (making goods and services for sale) to speculative activities (the buying of assets in the expectation that their prices will rise, such as houses, antiques, precious metals and shares). Speculative activity has a negative impact on the potential output of the economy if it becomes an easier way to create or maintain wealth than creating value through production.

In extreme cases, **hyperinflation** (rates of inflation above 30 per cent per annum) could lead to significant economic disruption if there is a diversion of effort towards

hoarding or non-productive activity. Under these circumstances, people lose confidence in money's two main functions as a measure of value, and a store of value. It becomes difficult to maintain normal trading relationships. Despite having huge reserves of oil, Venezuela's economy was at risk of collapse in 2019 with inflation peaking at an incredible 314 thousand percent. This caused significant depreciation of the currency and rising prices for imports. The core of the problem in Venezuela's case was political mismanagement – the government increased the money supply by giving workers wage increases to compensate for lower earnings from oil when prices fell in the 2000s. This started an inflationary spiral of wages and prices. Venezuela's inflation rate was 28 per cent per month in late 2021.

As mentioned previously, inflation affects everyone because it erodes purchasing power and creates uncertainty. But the burden of inflation does not fall evenly on everyone in the community. Living standards of low income earners and recipients of transfer income (such as pensions) will fall during periods of inflation unless their payments are 'indexed' to rise along with prices. Australian welfare payments such as the age pension are indexed to some extent, but only updated twice a year.

Inflation has different consequences for creditors (lenders) and debtors (borrowers). Lenders 'lose' unless the rate of interest they are charging is higher than the inflation rate (i.e. a positive real rate of interest). Savers, who are essentially households lending their surplus income to banks or financial institutions, see the real value of their deposits fall during inflationary periods. Consider a \$1000 savings account, earning an interest rate of 3.5 per cent when annual inflation is 2 per cent. The real interest rate is thus 1.5 per cent. At the end of the year, interest earned is \$35, but inflation has eroded \$20 of this amount, leaving the saver only \$15 better off in real terms (and possibly liable to pay income tax on the \$35 interest!).

Borrowers tend to benefit from inflation, because they can build up their assets on borrowed money, knowing that the real value of their repayments will fall over time. Homebuyers who take a housing loan of \$300,000 and initially have to pay about \$2000 per month in interest can be confident that, over say a ten year period, the value of the house will rise due to inflation, but the impact of the \$2000 monthly payment on their purchasing power will fall.

Parts of the economy that have market power (perhaps business owners who can pass on price increases to their customers, or workers who can negotiate wage increases) seem more capable of maintaining their real incomes. People who are able to anticipate inflation may be able to arrange their financial affairs to benefit from expected price increases. As explained earlier, households that are able to purchase real assets which tend to rise in value with inflation (e.g. property) insulate themselves to some degree from falls in real purchasing power.

A buyer earning \$8,000 a month has a \$300,000 loan on a property currently worth \$600,000. Repayments on the loan are \$1500 per month. Assume inflation is 3% p.a., and both property values and wages rise at this rate. After 10 years, the property will be worth \$805,000, and she will earn \$10,750 per month. The monthly repayment has fallen from 19% of income to 14%, and the property value has risen 34%!

'Pay as you go' (PAYG) taxpayers suffer **bracket creep** as income rises with inflation, but this makes taxpayers liable for higher marginal rates of taxation. Australian taxpayers face more bracket creep than they used to because there are now fewer tax brackets (see chapter 12). This has made Australia's income tax system less progressive (i.e. more regressive).

The redistributive effects of inflation partly depend upon how well price increases were anticipated by households and businesses. If the extent of price movements is anticipated, then redistributive effects may not be as significant. For example, if banks and their customers both correctly forecast the inflation rate, nominal interest rates on both deposits and loans would rise, resulting in little real effect. If, however, one or more groups in the economy fails to anticipate the rate of inflation correctly, then there is a real effect and winners and losers emerge.

Mild inflation may not have much effect on most members of the community. Although prices rise, incomes generally rise at a similar rate (although there may be a time-lag). To some extent, therefore, inflation is an illusion, because although nominal prices are rising, real prices may change very little. If a worker's money income rose by five per cent, and prices rose by four per cent, then the worker is only one per cent better off in real terms!

Review quiz

- 1. How does inflation affect household purchasing power?**
- 2. If the nominal interest rate was 5% per annum, and the current inflation rates was 3%, what is the real rate of interest?**
- 3. An overseas buyer wants to buy salmon from Canada, where inflation is 3% p.a. Australian salmon of equivalent quality is rising in price at 5% p.a. Is Australia's fishing industry at a competitive disadvantage? Explain.**
- 4. If inflation is expected to continue, how might business firms change the way they produce their goods and services to reduce costs?**
- 5. Borrowers win, and lenders typically lose when inflation occurs. Is this true?**

10

Unemployment



Learning objectives

In this chapter, you will learn about:

- ***the concepts of unemployment, full employment, the natural rate of unemployment, the participation rate, and underemployment***
- ***the measurement of unemployment***
- ***the types and causes of unemployment, including cyclical, structural and frictional***
- ***the effects of unemployment***
- ***the relationship between unemployment and inflation***

10.1 Unemployment and its measurement

Low unemployment is a key macroeconomic objective because of the financial and other costs it imposes on the unemployed and the community in general. Australia's population is about 26 million people, but not all of them work, either because they are under the minimum work age (15 years), they have retired, or they choose for some reason not to. The **labour force** is the term applied to the people who are either working, or seek to work.

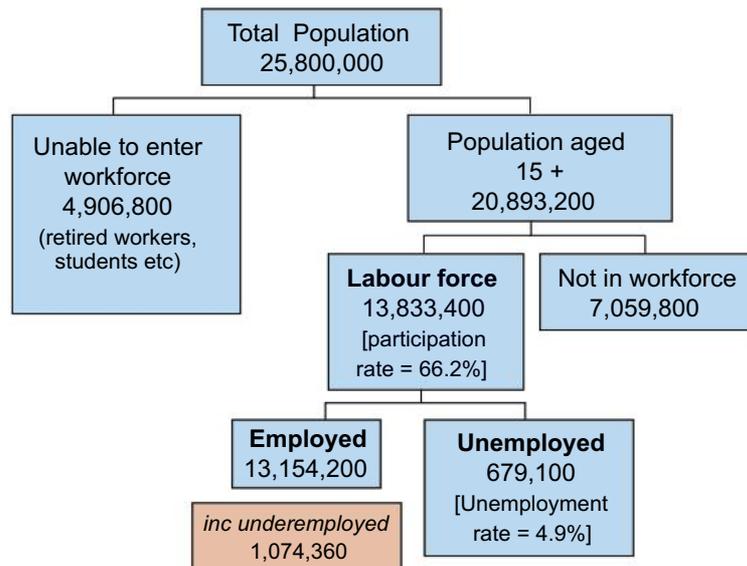
Labour force data is compiled by a monthly Australian Bureau of Statistics (ABS) survey. The survey, of about 50,000 people, identifies:

- those who were employed (those who had at least one hour of paid work, or worked unpaid in a family business); and
- those who were unemployed (people who were not employed during the survey period, but who had actively sought full-time or part-time work, and were willing and able to start work if offered a job).

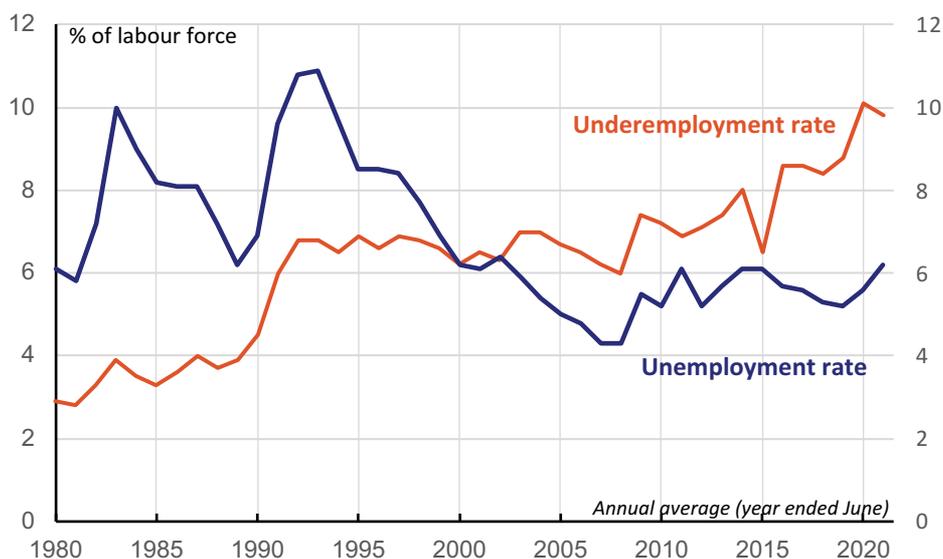
The proportion of the working age population that is in the labour force is known as the **participation rate**. The participation rate in June 2021 was 66.2 per cent. Labour force participation has trended upwards over time, rising from about 60 per cent in 1980. Male participation rates have fallen, from about 78 per cent in 1980 to 71 per cent in 2021. This may reflect higher education retention rates (completing higher levels of education before joining the workforce), changing social attitudes, or the fact that males are retiring earlier. In contrast, female participation rates have risen – from 45 per cent in 1980 to an average 61.7 per cent in 2021. Most of the increase is due to more married women participating in part-time or casual employment – 56

Figure 10.1 Labour force concepts

The figures refer to Australia's population and workforce as at June, 2021. The 21 million people over the age of 15 make up the 'potential' workforce, but seven million of these chose not to seek work. The participation rate is the proportion of people over fifteen years of age who are attached to the labour force (they are either employed, or are seeking work). The male participation rate in Australia is approximately 71 per cent - for females, 62 per cent.



Source: ABS 6202.0 July 2021

Figure 10.2 Australia's unemployment record: 1980-2021

Source: ABS Labour Force Australia, July 2021

per cent of married women worked in 2017, compared with 25 per cent in 1965. A number of factors have driven higher female participation, primarily the opportunity to contribute to family income, and the growing preference of women to have careers and involvement in work.

We can expect some fluctuations in the participation rate (perhaps one to one and a half per cent) in line with movements in the business cycle, because the apparent number of job opportunities influences peoples' decisions to seek work. Changes in labour force participation rates can affect employment statistics – an improvement in economic activity, for example, might not translate into shorter unemployment queues if more people decide to seek work.

Unemployment occurs when people who are willing and able to work cannot find a job. The **unemployment rate** is the proportion of the labour force who are willing and able to work, but have not been employed in paid work for at least one hour in the survey week.

Figure 10.2 shows the extent of unemployment in Australia over the period 1980 to 2021. The average rate of unemployment over the whole period was 6.8 per cent. Peaks in unemployment followed economic downturns in 1982-83; 1990-91 and 2008-09 (the Global Financial Crisis). Unemployment rates were lower through the 1990s and early 2000s, as Australia enjoyed economic prosperity. Unemployment rates in 2007 were the lowest in thirty years (although those rates seem high when compared to rates less than 2 per cent in the 1950s and 1960s). In the Covid-19 period, unemployment peaked at 7.6 per cent of the work force in mid-2020, but recovered quite quickly to fall below 5 per cent in mid-2021.

Labour market measures

- Participation rate = [labour force / working age population] x 100
- Unemployment rate = [number of people who are unemployed / labour force] x 100
- Underemployment rate = [number of part-time workers seeking more work / labour force] x 100.
- Underutilisation rate = unemployment rate + underemployment rate

“Underemployment or disguised unemployment reflects under-utilised productive capacity in our economy.” (ABS).

For over fifteen years, the headline unemployment rate has understated the ‘true rate’ by a fair margin. According to ABS figures, more than a million part-time workers would have preferred longer working hours in mid-2021. These people are **underemployed**. As figure 10.2 illustrates, underemployment has been on the rise over several decades, and was around 8 per cent in mid-2021, having reached as much as 13.6 per cent in April, 2020.

Taken together, the unemployment and underemployment rates represent the labour force **underutilisation rate**. In June 2021, the unemployment rate was 5.2 per cent and the underemployment rate was 8.4 per cent, meaning the underutilisation rate was 13.6 per cent.

Among other labour market statistics, the ABS also measures:

- hours worked, which offers an insight into current economic conditions, and points to likely changes in unemployment in the next couple of months. During an economic downturn, for instance, reducing hours is often an early response taken by businesses because it is preferable to paying off staff, especially those who have experience with the firm.
- the duration of unemployment (the period of time spent in unemployment). Over 20 per cent of all unemployed people were classified as long term unemployed (unable to find a job for more than one year) as at June, 2021.
- youth unemployment, which is consistently higher than adult unemployment. In mid-2021, the unemployment rate for 15-19 year-olds was 14.4 percent, and 7.5 per cent for the 20-24 year cohort. The underutilisation rate for 15-24 year-olds was 26.5 per cent (ABS).

Review quiz

1. *What is meant by the participation rate?*
2. *Describe the two components of labour force underutilisation.*
3. *An ABS survey showed that more people were employed in one month, but that the unemployment rate had risen. How could this be explained?*

Get the latest labour force data ...

The Australian Bureau of Statistics (ABS) updates labour force data every month. The release, titled 'Labour Force, Australia,' can be found from the ABS home page at abs.gov.au

10.2 The types and causes of unemployment

Unemployment is regarded as **voluntary** when a worker decides to leave a job to search for another position. **Involuntary** unemployment, on the other hand, occurs when a worker is laid off from their place of work (when there is not enough demand for their services, or for other reasons such as business restructuring). With these broad distinctions in mind, it is useful to describe the three categories into which economists usually classify unemployment.

Frictional unemployment

In economics, the term 'friction' is used to explain everything that might explain why markets don't work perfectly (quickly adjusting to equilibrium). Like other markets, the labour market matches the demand for labour (producers seeking to hire workers) with the supply of labour (workers seeking jobs). But the matching process is imperfect because both 'sides' of the market have imperfect information, and moving between one job and another is not 'costless'.

Frictional unemployment is voluntary, and occurs when workers are transitioning between jobs and have a temporary period of unemployment. This includes those who are entering the workforce, such as students seeking their first job; people re-entering work after some time off; people trying to find work in a different suburb or city, and those who quit their jobs to find another which they hope might offer better pay and conditions.

Frictional unemployment could be called 'search' unemployment because finding a suitable job usually takes time and involves 'search costs' such as reading job advertisements, writing applications, taking interviews and negotiating employment conditions. Even in the same occupation, jobs can be very different. An accountant, for example, might work in a suburban practice that deals with small business and taxation matters, yet be seeking a position in a CBD firm that does more advisory work with larger companies. She might have to leave the first job to devote enough time to finding a more suitable one.

Frictional unemployment is likely to be of short duration. It has short term costs for the individuals involved and the economy, but it brings benefits if the search process leads to better outcomes for workers and employers.

More than a million Australians change jobs each year. This is good for them, and for the economy, if they get 'better' positions.

Many employers pay 'efficiency wages' to staff (higher than market rates) to retain key employees. This is because there are considerable separation, recruitment and training costs involved in finding new workers.

Depending on the phase of the business cycle, it is likely that between one and three per cent of the workforce is frictionally unemployed. During a downturn, people are probably more reluctant to quit their job if they think it will be difficult to find a new one. Conversely, there would be more job search in a strong economy. As we will discuss, job search is a key reason why unemployment never actually gets to zero!

Cyclical unemployment

The demand for labour is derived from the demand for final goods and services. Therefore, **cyclical unemployment** can be expected to follow the ups and downs of the business cycle (see chapter eight). In periods of recession and trough, when there is a slowdown in the level of economic activity, unemployment will tend to rise in certain jobs where sales or production has fallen. On the other hand, when the level of consumer and business spending is high, there is a strong demand for labour to meet the need for goods and services, and cyclical unemployment will fall.

Many economists refer to cyclical unemployment as **demand-deficient** unemployment – it rises when there is insufficient demand to fully employ the country's resources, including labour. As shown in figure 10.2, there was higher-than-average unemployment in the recessions of 1982–83 and 1991–92. Unemployment was forecast to rise much more than it actually did in the Global Financial Crisis (GFC) of 2008–09, but significant government stimulus prevented it exceeding 7.5 per cent. Cyclical downturns feature lower spending on consumer durables, reductions in the level of business investment, and lower business and consumer confidence. As a result, business profitability is under pressure, and many firms need to shed labour in order to reduce costs and remain viable.

Cyclical unemployment is more likely in some sectors of the economy than others. Building and construction employment tends to soften when growth slows, as it does in sales-oriented jobs like retailing and motor vehicles. Jobs in hospitality and tourism will be harder to find, reflecting the impact of a downturn on household disposable income. A downturn would tend to have less impact in job markets associated with education, health and the public service, because demand for those occupations depends more on population size than variations in economic activity.

Cyclical unemployment falls in periods of economic expansion. Indeed, some commentators suggested that the peaks of economic activity in August 2000, and again in 2007, featured cyclical unemployment rates near zero. Supposedly, everyone with sufficient skills who wanted a job could find one!

Part-time employment now makes up about one-third of the workforce. This partly reflects workers wanting more flexible work, but also the trend for businesses to enjoy organisational flexibility and to be able to respond to fluctuations in demand for their goods and services. Hence the hours of work for part-time staff are susceptible to the economic cycle. Notice that the underemployment rate also kicked upwards in periods of softer economic growth in the early 1990s, 2009 and 2015. In 1992, the underutilisation rate was nearly 16 per cent of the labour force! This was again evident in 2020, reflecting the disruption associated with the pandemic.

Structural unemployment

Structural unemployment occurs when there is a mismatch of available and required skills in a sector of the economy. As its name implies, it is a result of the changes that are constantly modifying the structure of the economy.

Structural change has affected all sectors of the economy. In 1975, primary workers (those employed in jobs associated with the extraction of natural resources from the land) accounted for 7.5 per cent of the labour force. Today, the figure is less than 4 per cent. Manufacturing employment has declined as capital-intensive processes associated with the 'knowledge and service economy' replace labour-intensive forms of production. In developed countries, more than 70 per cent of GDP comes from the services sector, which has benefited most from the spread of information and communications technology (ICT).

Buyer preferences change in response to technological change and price signals. These changes are reflected in patterns of employment and production, such as:

- car buyers' demand for improved fuel economy followed the tripling of fuel prices in the 1970s;
- in the last twenty years, many Australian households have installed solar energy, incentivised by subsidies and the chance to sell power back in to the electricity grid;
- bank customers used to visit a 'bricks and mortar' branch and conduct their transactions 'over-the-counter'. Now, the majority of customers use a computer or smartphone for everyday banking;
- Australia is transitioning from the use of coal and oil to generate electricity to renewable sources, which currently supply about 30 per cent of Australia's energy requirements. This will have a significant effect on the structure of jobs in the regional areas and mining towns;
- free-to-air broadcasting is in decline whilst digital media and subscription video services are growing strongly; and
- the shift towards working from home during the pandemic may have long-term implications for the demand for office space in cities, and the way households buy goods and services.

Such changes have had a significant effect on the labour market as the demand for knowledge and skills declined in some areas, and increased in others. Many jobs were lost in routine tasks or those that could be automated. You won't find job advertisements for bank tellers; coal miners; typists; book-keepers and telephone operators. You will, however, see demand for the technical; problem-solving and interpersonal skills that underpin the knowledge economy.

In theory, structural unemployment should be temporary, although the duration of unemployment may be quite long, especially for older workers or those who have less formal education and on-the-job training. Structural unemployment also tends to affect some regions more than others. Automation (and international

competition) in manufacturing has turned former manufacturing centres into rust belts, but created new opportunities in the 'Silicon Valleys' of the world.

Over time, the demand-generation effects of new technology tend to outweigh its displacement effects. But the pace of change in recent years has been rapid, and structural unemployment has continued as a result.

Period of unemployment as at June 2021	Per cent of total
< 4 weeks	18
4-12 weeks	21
13-26 weeks	18
26-52 weeks	14
52-104 weeks	15
> 2 years	13

Commonwealth Government,
Labour Market Information Portal

The natural rate of unemployment

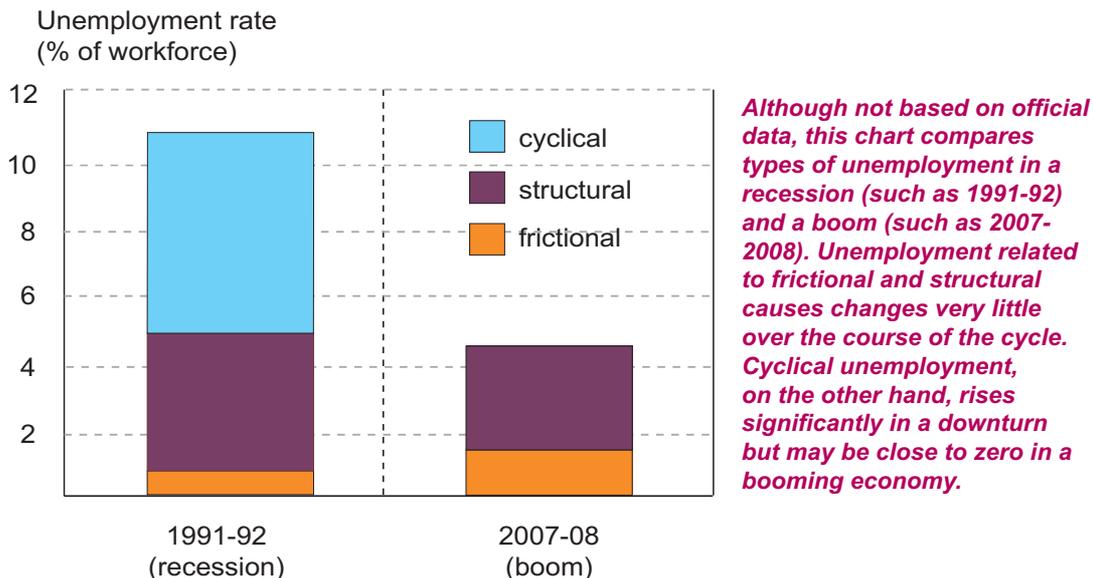
The booming economy over the period 2003-2008 saw unemployment rates fall to thirty-year lows. Even so, 457,300 people were officially listed as unemployed in August, 2008 (ABS). The obvious question to ask is why so many people were unable to find a job, even at the height of an economic boom?

The answer relates to a concept known as the **natural rate of unemployment**. This is the minimum level of unemployment that can be achieved, given the current characteristics of the labour market. The natural rate varies over time as conditions in the economy change. In the 1960s, the natural rate was probably around 1.5 per cent – change was slow and people tended to think of a job as a career. In more recent times, the natural rate of unemployment in Australia was in the region of 4.5 to 5.5 percent.

Why does it seem we can no longer get very low unemployment numbers? The first explanation for non-zero full employment is the presence of search unemployment – workers leaving their jobs to seek one that is more suitable. They may be unemployed for a period of time as they apply for other positions. Frictional unemployment also reflects the impediments and rigidities that prevent the labour market working efficiently. Minimum wage laws, for example, tend to create a surplus of labour. The minimum wage, being above market equilibrium, is good for those who have a job (because their wages are higher), but bad for those who are unemployed. Minimum wage agreements tend to create an employment barrier because the labour market cannot 'clear' – demand and supply are not in equilibrium. The extent of labour union power in some sectors of the economy may be an impediment to employment. It tends to be associated with above-equilibrium rates of pay and inflexibility associated with regulated working hours and conditions (whilst acknowledging that better working conditions were hard-fought union achievements in the past). There are many regulations affecting both the demand and supply sides of the labour market.

Perhaps a quarter of the current natural rate of unemployment is due to search unemployment.

The second explanation is persistent structural unemployment – as the structure of the economy changes, some workers lose their jobs due to changing technology and the decline of some industries and sectors.

Figure 10.3 Unemployment and economic cycles

Combined, these three characteristics of Australia's labour market make it difficult to achieve zero unemployment. At the time of writing, the Reserve Bank of Australia estimates that the natural rate of unemployment in Australia is around 4.5 per cent of the workforce. Anything above that represents excess capacity in the labour market.

Figure 10.3 apportions the total unemployment rate during a deep recession (such as in 1992) and a period of expansion (such as 2006-2007) to the three types of unemployment identified earlier. In the 1991-92 recession, the unemployment rate reached 10.7 per cent of the work force, with 910,000 people without a job (ABS). Of this, perhaps 1 percentage point was due to job search (frictional unemployment) and 4-5 percentage points was due to structural unemployment (the mismatch between worker skills and market requirements). The rest (the blue area in the chart) was cyclical unemployment resulting from the downturn in economic activity.

Like many countries, Australia experienced rapid economic growth in the early-mid 2000s. In 2007, the unemployment rate was 4.3 per cent (470,000 people). The frictional component of the total would probably have been somewhat higher-than-normal as people sought new positions when economic activity was strong. Structural unemployment would still have accounted for 3-4 percentage points of the total. Demand deficient unemployment, on the other hand, was probably close to zero. Anyone willing and able to work in 2007 could get a job!

Review quiz

1. Three key words that describe frictional unemployment are 'voluntary', 'search' and 'temporary'. Explain.
2. Why is cyclical unemployment sometimes described as 'demand-deficient' unemployment?
3. Suggest three occupations or job groups that are likely to be affected by movements in the business cycle, and three that are unlikely to be impacted.
4. Give three examples of jobs/occupations that no longer exist because structural change has occurred.
5. Describe the meaning of the 'natural rate' of unemployment. Under what circumstances could the unemployment rate decline to zero?

10.3 The effects of unemployment

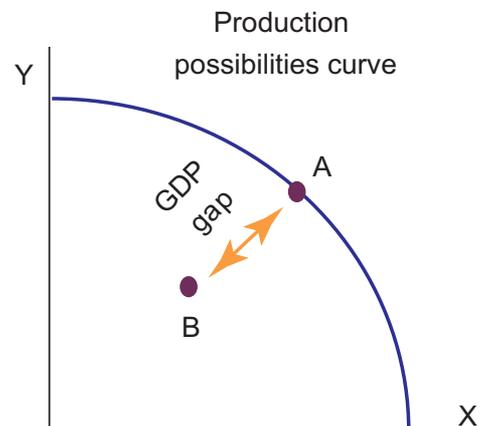
Unemployment affects the potential output of the economy, and the way in which national output is divided amongst the members of the community.

Unemployed labour represents unused resources, so the output of the economy with unemployment must be less than its potential. Figure 10.4 uses the production possibility frontier model to illustrate how unemployment represents a gap between actual and potential output. Point A (on the frontier) represents an economy in which resources are fully employed. Point B indicates less-than-full employment. There is a **GDP gap** when actual levels of output, income and employment lie inside the production possibility frontier.

The GDP gap suggests that unemployment imposes a direct cost on the economy. With a few assumptions, it is possible to estimate the extent of lost production and

Figure 10.4 Unemployment: the 'GDP gap'

The GDP gap represents the difference between actual and potential output and income in the economy. Here, the gap is the difference between point A, which lies on the production possibility frontier, and point B, which lies inside the frontier. The gap represents unemployment's costs in terms of lost output and income.



income. In June, 2021, the AWOTE (average weekly ordinary time earnings) for full-time employees was approximately \$1740. 640,000 people were unemployed, so the direct cost to the community in lost output and income was \$1.1 billion per week, or about \$56 billion in a full year (nearly 3 per cent of GDP).

A second direct cost of unemployment is welfare payments. Welfare payments obviously come from employed taxpayers' pockets. The Jobseeker payment for a single person over 21 years of age is approximately \$625 per week (October, 2021). If we use this as a benchmark, and multiply it by the number of unemployed people (assuming they have all applied for benefits), then the welfare cost of unemployment exceeds \$15 billion per annum. Thus the total direct cost in lost wages and taxes, and the cost of welfare payments, is about 3.75 per cent of GDP. This figure does not include the opportunity cost of unemployment – the benefits that could have been obtained had the lost taxation and welfare payments been spent on infrastructure, health, or education. Over the long term, persistent unemployment also reduces the rate of economic growth because the capacity of the economy to satisfy future wants is reduced (as described in figure 7.1)

Unemployment tends to affect some groups of people more than others – figures show that the 15-19 age group, the middle aged, and minority ethnic groups are prone to be unemployed for long periods of time. In addition, unemployment rates can vary significantly in areas of capital cities and across the nation.

Despite the fact that unemployment benefits are available, they do not provide for a comfortable lifestyle. The effects of unemployment may be particularly long-lasting for those who have low levels of educational qualifications and skills, and those who cannot easily adapt to the changing requirements of the workforce. There are real personal, family and social problems associated with unemployment, particularly for those who have been out of work for a long period of time. These contribute to the financial and opportunity costs of unemployment for society.

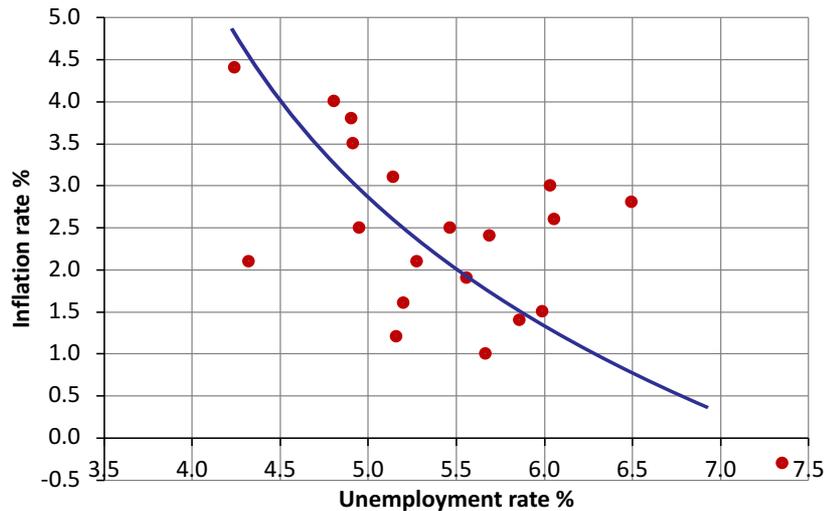
10.4 The relationship between unemployment and inflation

Unemployment is normally referred to as a countercyclical variable. This means that it moves in the opposite way to the business cycle – as economic growth increases, cyclical unemployment falls. Inflation (especially demand inflation), on the other hand, is a procyclical variable – it moves with the business cycle, increasing as economic activity rises. This means that if we compare the unemployment rate and the inflation rate over time then we are likely to see a negative relationship – as unemployment falls, inflation should rise (and vice versa).

The logic behind the proposed relationship is that as economic activity increases, the unemployment rate will fall. Excess demand in the labour market will lead to increasing wages as employers compete for workers. Higher wages increase production costs and this is normally passed onto consumers as higher prices, thus leading to a rise in the rate of inflation. This is the basis for the negative relationship between unemployment and inflation.

Figure 10.5 The Phillips Curve

The Phillips Curve proposes that low unemployment will increase wage inflation. The data for Australia generally shows a negative relationship between unemployment and inflation.



This inverse relationship between unemployment and inflation was first researched by a New Zealand economist in 1958 (William Phillips) and now bears his name - the **Phillips Curve**. It highlights one of the important relationships in macroeconomics. The dots in figure 10.5 plot Australian unemployment and inflation data for each year between 2002 and 2021. The curved line is the 'line of best fit' and suggests a definite Phillips curve for the period. It is evident that as the unemployment rate decreases (rises), the inflation rate increases (decreases). The curved line suggests that a 1 per cent change in the unemployment rate causes a 2 per cent change in the inflation rate.

Review Quiz

1. Explain what is meant by the 'GDP gap'.
2. Outline the opportunity costs associated with a high rate of unemployment.
3. What does the Phillips curve show?
4. Explain why a decrease in unemployment would increase the rate of inflation.

11

Trade and the balance of payments



Learning Objectives

In this chapter you will learn about:

- *the composition and direction of Australia's trade*
- *the concept of the balance of payments*
- *the general structure of the current account and the capital and financial account*
- *the distinction between the current account and the capital and financial account*
- *the relationship between the current account and the capital and financial account*

Introduction

Australia is closely linked to the global economy through the flow of goods and services, the flow of financial capital and the flow of people including tourists, students, workers and migrants. Given the events of 2020-21 we should also add the flow of pandemics! Nobody can escape the global economy and no economy can afford not to participate in the global economy. The car you drive, the coffee you drink, the clothes you wear and the phone you use are all likely to be imported. Australia not only gains economic benefits from participating in the global economy, but also political, social and cultural benefits. Today, one in five jobs is export related, while around 25 per cent of Australia's income is generated by exports. Australia not only benefits from trade but also relies on foreign investment - the inflow of foreign savings which helps to fund our domestic investment needs, such as the mining sector.

If you board a flight to an overseas destination such as Bali or New York you are participating in global trade. Similarly if you download a music file from the

Did you know?
Exports and imports each represent around 24 per cent of Australia's GDP. Without foreign investment, Australia would not have a mining sector.

internet or buy the latest smart phone you are engaging in an international transaction. Life would be very boring without access to the global economy. There would be no foreign films, foreign music or overseas travel. An international student studying in Australia, an Australian student backpacking overseas and a foreign firm buying shares in an Australian company are all examples of global economic transactions. Rapid developments in transport and communications have enabled people to interact with the global economy on a daily

basis. Consumers benefit from the global economy by being able to consume a much wider variety of goods and services. Producers benefit because they can sell their output to a greater number of buyers. The exchange of goods and services is an important characteristic of any specialised economy. Specialisation and trade enable people to achieve a higher standard of living.

11.1 The pattern of Australia's trade

Who does Australia trade with and what goods and services do we trade? The pattern of Australia's trade reveals much about the nature of the Australian economy. The direction of our trade is reflected in our close proximity to the Asia-Pacific region, while the composition of our trade reflects the nation's natural resource wealth. Australia is rich in primary resources. We have an abundant supply of mineral and energy wealth and have vast tracts of land that can be used for crops and livestock. Australia's trade advantage is in the primary industries - resources and agriculture. Australia is a leading world exporter of iron ore, coal, natural gas, gold, bauxite, wool, wheat and beef. Australia is fortunate to be located within the Asia-Pacific region - the most populous and fastest growing region of the world. Australia's largest trading partners are China, the United States and Japan. These three countries account for around 50 per cent of Australia's two-way trade.

China overtook Japan as Australia's main trading partner in 2009. China's economy, with its huge billion plus population, continues to grow and develop and is a major buyer of Australia's resources such as iron ore, coal and natural gas. Figure 11.1 shows the direction of Australia's trade - our main trading partners in 2020. It is important to remember that trade is a two way process - it involves both exports and imports. Australia's three largest export markets are China, Japan and the Republic of Korea, while the three most important import partners are China, the United States and Japan.

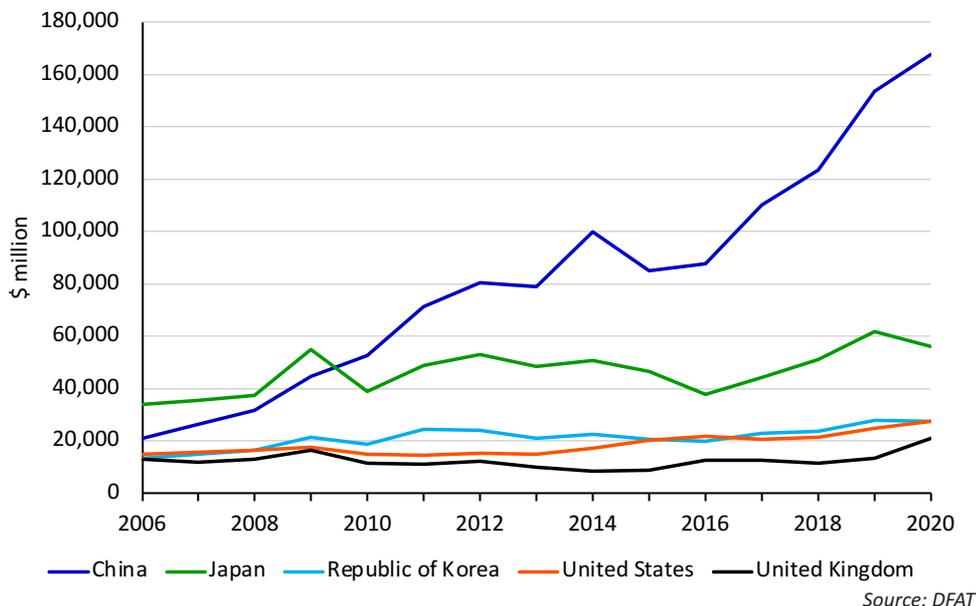
In terms of Australia's exports, the top four countries account for over 50 per cent of total exports. Each of these four countries is part of the Asia-Pacific region.

Figure 11.1 The direction of Australia's trade

A. Australia's Main Export Markets 2020				
Rank	Country	Goods & Services \$m	% share	Annual % growth 2015-20
1	China	160,254	36.7	15.1
2	Japan	46,359	10.6	6.0
3	United States	27,459	6.3	5.3
4	Republic of Korea	25,189	5.8	6.5
5	United Kingdom	18,777	4.3	13.2
6	India	16,922	3.9	6.4
7	Singapore	15,492	3.6	9.5
8	New Zealand	13,776	3.2	3.0
9	Taiwan	10,839	2.5	10.0
10	Hong Kong	8,771	2.0	-5.7

B. Australia's Main Import Sources 2020				
Rank	Country	Goods & Services \$m	% share	Annual % growth 2015-20
1	China	86,060	23.8	7.3
2	United States	45,395	12.5	0.8
3	Japan	19,900	5.5	-0.6
4	Germany	16,282	4.5	1.7
5	Thailand	14,855	4.1	-0.5
6	United Kingdom	12,997	3.6	-0.8
7	Singapore	11,016	3.0	-1.0
8	Malaysia	10,591	2.9	1.0
9	New Zealand	9,920	2.7	-1.2
10	Republic of Korea	9,684	2.7	-8.4

Source: DFAT Trade Statistics

Figure 11.2 Australia's export markets

Three quarters of Australia's two-way trade is with the Asian region. Obviously geographical proximity is a major factor in explaining who Australia trades with, but other factors such as political and historical links are also important. Australia has a rich endowment of natural resources which complements the manufacturing giants of China, Japan and Korea. Australia has recently signed free trade agreements with China, Korea and Japan helping to increase trade flows with these countries. The graph above shows the changes in Australia's export markets since 2006. It is easy to see the emergence and dominance of China as Australia's main trading partner. In fact Australia's economic prosperity will be closely aligned to the Chinese economy in the foreseeable future.

What are the main goods and services that make up our trade? Figure 11.3 shows the composition of Australia's trade - panel A lists Australia's top 10 exports and imports while panel B shows the main categories of trade. Iron ore and coal were

Did you know?

Australia is the number one global exporter of coal, iron ore & aluminium, the 2nd largest exporter of LNG and the 3rd largest exporter of copper

Australia's leading exports in 2020 followed by natural gas, education and gold. Notice the dominance of the primary sector - eight of the top ten exports are either resources or rural goods. Primary exports account for over around three quarters of Australia's exports. Many would be surprised to see that education exports are Australia's fourth largest, rating higher than other

resource exports such as gold and aluminium. Services exports, including tourism and professional services, have been increasing over time and normally account for over 20 per cent of total exports, however they were adversely affected by the Covid pandemic in 2020-21 .

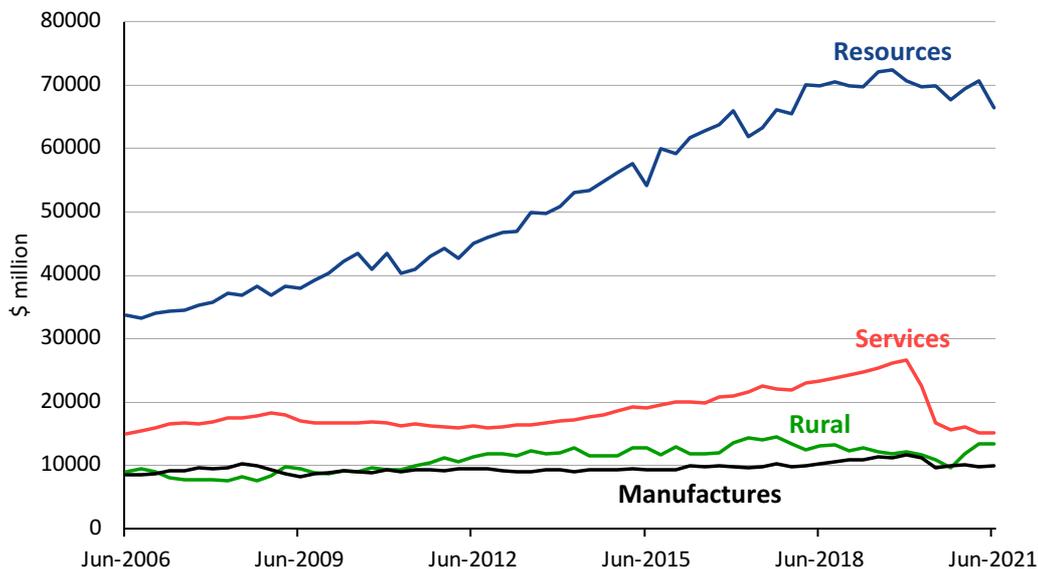
Figure 11.3 The composition of Australia's trade

A. Australia's Main Exports & Imports 2020						
Rank	Exports	\$m	%	Imports	\$m	%
1	Iron ore	116,915	26.8	Passenger motor vehicles	18,690	10.8
2	Coal	43,368	9.9	Refined petroleum	15,857	6.1
3	Natural gas	36,209	8.3	Telecom equipment & parts	14,783	5.4
4	Education	31,688	7.3	Freight services	11,308	3.5
5	Gold	25,492	5.8	Computers	10,441	3.3
6	Beef	9,596	2.2	Gold	9,207	2.6
7	Aluminium ores	8,301	1.9	Goods vehicles	8,985	2.4
8	Copper ores	7,148	1.6	Personal travel	8,640	2.3
9	Crude petroleum	6,239	1.4	Professional services	8,464	1.8
10	Professional services	5,500	1.3	Medicaments	8,241	1.7
	All exports	436,365	100	All imports	361,819	100

Source: ABS

B. Composition of Trade 2021			
Exports	% Share	Imports	% Share
Resources	63	Intermediate & Other	30
Services	14	Consumption	26
Manufactures	12	Capital	19
Rural	11	Services	24

The largest imports were passenger motor vehicles, refined petroleum and telecom equipment and parts. Personal travel (Australian tourists travelling overseas) is usually Australia's largest import, but in 2020 it was ranked a lowly number eight. The reason for its fall in importance was the effect of the pandemic which severely restricted the movement of people. Panel B in figure 11.3 shows the main categories of trade. The resources sector (mining) dominates exports accounting for over 60 per cent. Manufactured goods account for over half of Australia's imports - comprising consumption goods, capital goods and intermediate goods. Intermediate goods are inputs, such as raw materials, used by firms to produce final consumer goods. It is interesting to note that the business sector import more goods than the household sector. Figure 11.4 shows the change in Australia's export categories since 2001.

Figure 11.4 Australia's export categories

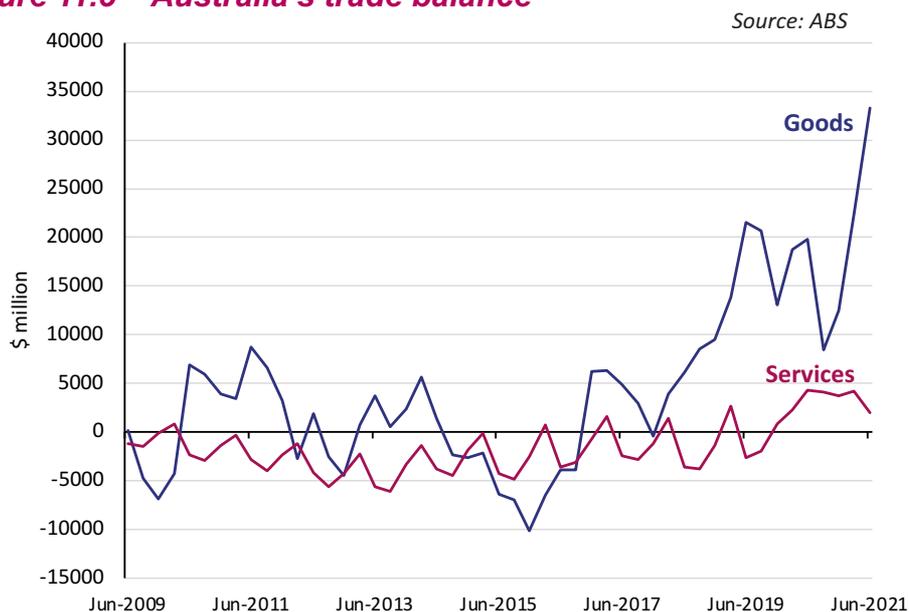
Source: RBA

Review Quiz

1. How is Australia linked to the global economy?
2. Explain how consumers and producers benefit from the global economy.
3. List Australia's top five export and import partners.
4. List Australia's top five exports and imports.

11.2 Australia's trade balance

Many people believe that countries should try and increase their exports relative to imports – to aim for a trade surplus rather than a trade deficit. But this is a myth, dating back to the days of the Mercantilists who believed that exports were good and that imports were bad for the economy. It is simply not possible for every nation to have a trade surplus! Both exports and imports bring gains to the economy. Participating in international trade boosts economic development and growth and raises living standards. Exports of goods and services earn foreign exchange which is used to pay for imported goods and services. The balance on goods and services measures the extent to which the value of exports and imports differ. Exports and imports are equivalent in terms of their effects on economic welfare. Exports bring benefits to the production side of the economy while imports bring benefits to the consumption side of the economy. A country will gain if it increases both its exports and imports. At any point in time, a nation can experience a trade surplus or a trade deficit. A **trade surplus** occurs if the total value of goods and services exports exceeds

Figure 11.5 Australia's trade balance

the total value of goods and services imports. A **trade deficit**, on the other hand, occurs when the total value of imports exceeds the total value of exports. It is normal for Australia's trade balance to fluctuate from deficit to surplus. Figure 11.5 shows the trade balance for both goods and services. Notice that the goods balance is far more volatile and can swing from deficit to surplus from one year to the next. The services balance is less volatile and normally records a deficit. In 2020 and 2021, however, net services recorded strong surpluses due to effect of the Covid pandemic which restricted trade in many services, including tourism.

Are trade deficits a sign of a poorly performing economy? The media would have us think so, but as usual they do not understand their basic economics! The trade balance is determined by a multitude of factors. Australia's exports are determined by other countries demand for our goods and services. If the Chinese and Japanese economies experience strong economic growth, then our resource exports to these economies will increase. Australia's imports on the other hand, are determined by our own domestic growth. Strong economic growth in Australia will increase spending not only on consumer imports, such as motor vehicles, computers and mobile phones but also on intermediate and capital goods imports. For example, during the resources boom, the mining sector required significant imports of capital goods such as machinery and transport equipment.

An important factor affecting Australia's trade balance is the prices we receive for our commodity exports such as iron ore, coal and natural gas. When **commodity prices** increase, our trade balance also increases because the value of our exports rises relative to imports. This has been the main reason for the surge in Australia's trade balance since 2017, rising to a record surplus in 2021.

11.3 The balance of payments

The **balance of payments** is a record of all economic transactions between the residents of Australia and the residents of the rest of the world. The residents of a country include individuals, firms and the government. An economic transaction occurs when something of value is provided by one party to another. Most transactions involve an exchange, for example, a good or service is traded for foreign exchange (money).

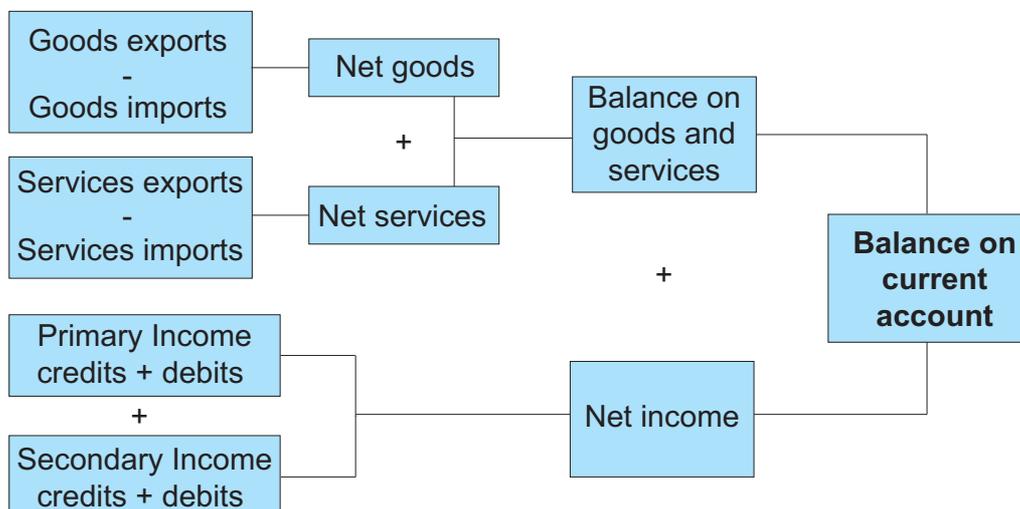
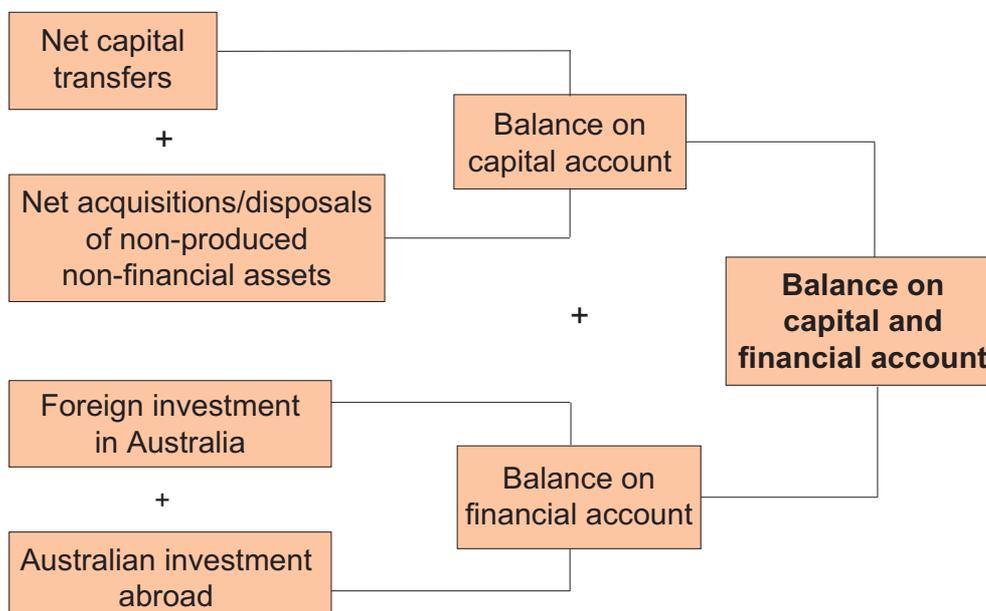
Economic transactions include:

- exports and imports of goods, such as iron ore, coal, gold, wheat, wool, computers, motor vehicles, machinery and clothing;
- exports and imports of services such as shipping, freight, insurance, expenditure by tourists and overseas students;
- income flows, such as dividend and interest payments associated with foreign investment;
- transfers, such as foreign aid and funds brought by migrants and
- financial flows, such as purchases of shares and securities and loans.

Whenever a transaction occurs involving any one of these categories between a resident of Australia and a non-resident, then it will be recorded in the balance of payments. Australia's balance of payments is divided into two broad accounts - the current account and the capital and financial account. Figure 11.6 shows the structure of the two accounts. The current account is concerned with transactions involving goods, services and income. The capital account records capital transfers and the acquisition/disposal of non-produced, non-financial assets, for example, copyrights. The financial account includes transactions in financial assets and liabilities, more commonly known as foreign investment. Each transaction in the balance of payments is recorded as consisting of two equal and opposite entries, reflecting the inflow and outflow element to each exchange. For each transaction, each party records a matching credit and debit entry:

- **Credit** — exports of goods and services, income receivable, increase in foreign liabilities, export of currency
- **Debit** — imports of goods and services, income payable, increase in foreign assets, import of currency

Since for each transaction there is a matching credit and debit entry, the overall balance of payments must always balance. This means that the sum of all credit entries will be exactly offset by the sum of all debit entries. But each of the two accounts can record either a deficit or a surplus. For example, if the current account recorded a deficit of \$10 billion, then the capital & financial account would record a surplus of \$10 billion. To illustrate how the recording of transactions works we will use a simple example consisting of an Australian resident purchasing a motor vehicle from Japan for \$AUD50,000 and a Japanese resident buying an Australian government bond for \$AUD10,000. How will these transactions be recorded in Australia's balance of

Figure 11.6 The structure of the balance of payments**Current Account****Capital and Financial Account**

payments? Remember for each transaction there are two offsetting entries. The value of the imported car will be recorded in the current account as a debit of \$50,000, while in the financial account it will be recorded as a \$50,000 credit, because \$50,000 of Australian currency is exported to Japan. When the Japanese resident purchases the Australian government bond, it will be recorded on the financial account as a credit entry of \$10,000 representing the bond which is exported and a debit entry of \$10,000 of Australian currency which is imported.

The following table shows the entries for each transaction in Australia's balance of payments. Notice that the sum of debit entries (\$60,000) is offset by the sum of the credit entries (\$60,000). The current account shows a deficit of \$50,000, while the capital/financial account shows a surplus of \$50,000.

	<i>Credit</i>	<i>Debit</i>
<i>Current Account</i>		-\$50,000 (car)
<i>Capital/Financial Account</i>	+\$50,000 (currency) +\$10,000 (bond)	-\$10,000 (currency)

Now suppose an Australian firm sells \$50 million of iron ore to China and a US firm purchases \$10 million of Australian shares. How would these transactions be recorded? The value of the exported iron ore will be recorded in the current account as a credit of \$50 million, while in the financial account it will be recorded as a \$50 million debit, because \$50 million of currency is imported. The sale of \$10 million of shares to a US firm will be recorded as a credit in the financial account because the shares are exported while there will be a matching debit entry of \$10 million representing the import of currency. The table below shows how each transaction will appear in the balance of payments.

	<i>Credit</i>	<i>Debit</i>
<i>Current Account</i>	+\$50 million (iron ore)	
<i>Capital/Financial Account</i>	+\$10 million (shares)	-\$50 million (currency) -\$10 million (currency)

Notice that total credits (\$60 million) are offset by total debits (\$60 million) so that the balance of payments balances. But in this example, the current account records a surplus of \$50 million, while the capital/financial account records a deficit of \$50 million.

Figure 11.7 provides a breakdown of the components in the balance of payments for Australia on an annual basis from 2018 to 2021. Note that for each year, the balance on current account is equal and opposite in value to the balance on the capital and financial account plus the net errors and omissions item. Traditionally, Australia records a deficit in the current account matched by a surplus in the capital and financial account. But in 2020 and 2021, this pattern was reversed. Australia recorded relatively large current account surpluses and corresponding capital/financial account deficits.

Figure 11.7 Australia's balance of payments

Source: ABS 5302

		\$ million (annual)			
CURRENT ACCOUNT		2018	2019	2020	2021
Goods		12665	53501	72256	76639
	Exports	315342	373509	383053	396749
	Imports	-302677	-320008	-310797	-320110
Services		-6082	-4954	5556	14108
	Exports	87705	96889	92035	62627
	Imports	-93787	-101843	-86479	-48519
Balance on goods and services		6583	48547	77812	90747
Primary Income		-57666	-62286	-40501	-17948
	Credits	59586	70696	68715	66024
	Debits	-117252	-132983	-109216	-83973
Secondary Income		-784	-770	-1322	-3064
	Credits	10051	10691	10454	9558
	Debits	-10835	-11461	-11776	-12622
Net Income		-58450	-63056	-41823	-21012
BALANCE ON CURRENT ACCOUNT		-51867	-14509	35989	69734
CAPITAL ACCOUNT		2017-18	2018-19	2019-20	2020-21
Net Capital transfers		-849	-811	-751	-751
Net acquisition/disposal of non-produced, non-financial assets		177	41	-364	3
Balance on capital account		-672	-770	-1115	-748
FINANCIAL ACCOUNT					
Direct investment		63780	65166	29651	9074
Portfolio investment		18465	-89221	-12620	-64362
Financial derivatives		11922	-91391	31191	-25378
Other investment		-5255	-152663	48626	-28152
Reserve assets		-22432	-213936	66062	-30926
Balance on financial account		56728	12544	-36026	-57554
BALANCE ON CAPITAL & FINANCIAL ACCOUNT		56056	11774	-37141	-58302
Net errors and omissions		-4189	2735	1152	-11432
Overall BALANCE OF PAYMENTS		0	0	0	0

Review Quiz

1. *What is the balance of payments?*
2. *What is recorded in the current account?*
3. *What is recorded in the financial account?*
4. *Why must the balance of payments balance?*
5. *If an Australian firm purchases computers worth \$25,000 from China, how will this be recorded using the double entry recording system?*

11.4 The current account

The current account records transactions between Australian residents and non-residents in three categories:

- goods
- services
- income (primary & secondary)

There are two parts of the current account - the trade balance and the net income balance. The trade balance measures the difference between Australia's exports of goods and services and imports of goods and services. Some examples of transactions in goods and services include:

- an Australian mining company sells iron ore to a Chinese steel manufacturer. The iron ore sale represents an export of goods - a credit in the current account.
- the same Australian company may purchase new mining equipment from a German company. This transaction is an import of goods - a debit in the current account.
- the same Australian company may also pay a Chinese shipping company to transport the iron ore from Port Hedland to Shanghai. This transaction is a service import in the current account.
- thousands of overseas tourists normally arrive in Australia every month. Their accommodation, meals and expenditures represent service exports - a credit in the current account.

Trade in goods includes exports and imports of raw materials, manufactures, minerals and fuels, food and rural products. Australian exports are concentrated in the agricultural and mining sectors, while imports consist mainly of intermediate and capital goods used by industry and consumer goods. In terms of absolute size, trade in goods is the largest item in the current account. Goods exports in 2021 amounted to \$397 billion, of which \$274 billion (69%) were resources, including iron ore, coal, natural gas, petroleum and gold. Goods imports equaled \$320 billion of which 66 per cent comprised capital & intermediate goods. The merchandise (goods) trade account recorded a record surplus for 2021 equal to \$77 billion.

Trade in services consist of transactions in the transport of goods (freight, shipping, and insurance), transactions involving travel by tourists, workers and students, and other services including financial, communication, construction and information. Trade in services is about a quarter of the size of trade in goods and has been increasing over time. In 2021, service exports totalled \$63 billion while service imports were \$49 billion. Australia normally records a trade deficit in services due to outbound tourism and transport payments. But in 2020 and 2021, Australia recorded a trade surplus due to the impact of the Covid pandemic. Notice the large deficit in transport (\$10bn). Australia normally records a large travel services deficit due to outbound tourists, however in 2021 with travel restrictions there was a large travel surplus. The export of education services has become an important service export for Australia totalling \$27 billion in 2021. This actually exceeds the value of Australia's gold exports. Australia recorded an overall trade balance (both goods and services) for 2021 of \$91 billion. This was the highest trade surplus ever recorded!

Goods 2021 \$ billion	
Credits (Exports)	
Rural	48
Resources	274
Manufacturing	40
Debits (Imports)	
Consumer goods	-119
Capital goods	-84
Intermediate goods	-128

Services 2021 \$ billion		
	Exports	Imports
Transport	4	-14
Travel	28	-1
Financial	4	-2
Information	5	-5

The income category of the current account is divided into primary and secondary income. Primary income is the largest and most important of the two and refers to income earned by Australian residents from non-residents (credits) and income paid to overseas residents (debits). For example, if an Australian company borrowed money from overseas to finance capital investment, it would have to make an annual interest payment on that loan. The interest payment would be classified as an income debit. If an Australian resident receives a dividend payment from a US company, then that would be recorded as an income credit transaction. Primary income consists of two categories: compensation of employees (for the use of labour) and investment income (for the use of capital).

Compensation of employees is simply the payment of wages and salaries to workers and is relatively small compared with the flow of investment income. In 2021, compensation of employees recorded a deficit of \$2 billion. Investment income comprises income earned from the provision of financial capital or foreign investment and consists of income associated with direct investment and income associated with portfolio investment. Over 95 per cent of primary income transactions are associated with investment income. In 2021, Australia received \$66 billion of investment income

Primary Income 2021 \$ billion		
	Credits	Debits
Compensation of employees	1	-3
Investment income	65	-81
- Direct	25	-40
- Portfolio	35	-34
Total primary income	66	-84

from overseas countries, but paid out \$81 billion to overseas residents - a deficit of \$16 billion. Australia records a relatively large primary income deficit in the current account because of the large amount of foreign investment that flows into the Australian economy. Reinvested earnings and dividends account for around 60 per cent of investment income while interest accounts for 40 per cent.

The overall balance in primary income was a deficit of \$18 billion. Many people become alarmed at the size of this deficit but it is important to remember that it is due to the net inflow of foreign investment. A large outflow of investment income indicates that the Australian economy is performing well. If foreign investment into Australia increases, then the primary income deficit will also increase. The secondary income category involves transactions where real or financial resources are provided (goods, services or financial assets) but nothing of economic value is received in return. These type of transactions could be labelled as 'one sided'. Secondary income includes transactions in foreign aid, gifts, donations and pensions. An example of a debit transaction would be foreign aid given by Australia to Indonesia, while an example of a credit transaction would be gifts received by Australian residents from residents in a foreign country. The size of secondary income transactions is relatively small and insignificant .

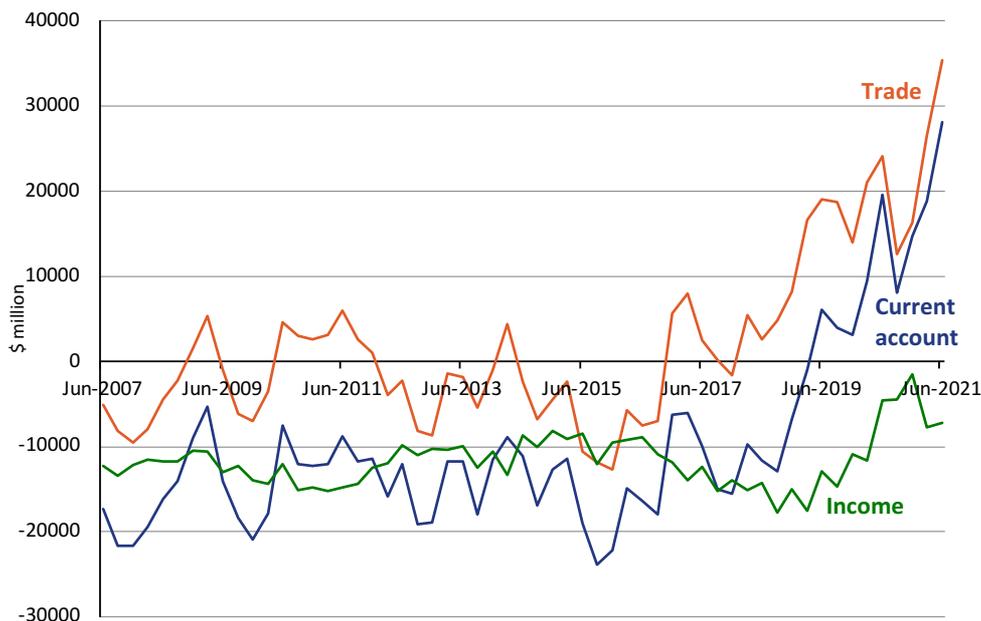
The Current Account	
	Balance on Goods and Services
+	Net Income
=	Balance on Current Account

To obtain the overall balance on current account, the balance on goods and services is added to the income balance (primary plus secondary). For 2021, the goods and services balance was a surplus of \$91 billion while the income balance was a deficit of \$21 billion. This meant that the balance on current account was equal to a surplus of \$70 billion.

Figure 11.8 shows Australia's trade, income and current account balances on a quarterly basis since 2007. Notice how the current account balance matches the changes in the trade balance. Between 2007 and 2018, the current account was in deficit, rising to a surplus from 2019 onwards. The income balance is less volatile than the trade balance and was in deficit for the entire period. This reflects the income payments associated with Australia's high level of foreign investment. Increased demand for Australia's resource exports and high commodity prices were the key factors in driving Australia's record trade surplus and current account surplus in 2020-21.

Review Quiz

1. *What are the two parts of the current account?*
2. *What is Australia's largest export category?*
3. *What are the main transactions recorded in primary income?*
4. *Why does Australia always record a primary income deficit?*
5. *What main factors contributed to Australia's record current account surplus in 2021?*

Figure 11.8 The current account balance

11.5 The capital and financial account

The capital and financial account records flows of funds into and out of Australia which create an income stream in the future. The capital account is the smaller of the two, and records transfers of non-produced, non-financial assets, flows of migrants' assets and the exchange of intangible assets such as patents and copyrights. This account is quite insignificant because the overall value of transactions is relatively small. In 2021, the capital account recorded a small deficit of \$0.8 billion.

The financial account is more important and records transactions in financial assets and liabilities such as shares, securities and loans between residents of Australia and residents of overseas countries.

Basically, the financial account records foreign investment flows. It is important to remember that the current account records trade in goods, services and income, while the financial account records trade in savings and investment. Australia records a capital and financial account surplus to match the current account deficit. Remember that the two accounts must sum to zero. Australia has, for a very long time, relied on foreign investment to supplement its domestic savings to enable the development of its economy. Australia has had to rely on foreign investment to develop its vast mineral and energy wealth.

Capital Account 2021	\$ billion
Net Capital transfers	-0.8
Net acquisition/disposal of non-produced, non-financial assets	0.0
Total	-0.8

A financial account surplus means that a country draws on the savings (foreign investment) from the rest of the world. Transactions in the financial account are classified by type of investment:

- direct investment
- portfolio investment
- other investment
- reserve assets

Because Australia has relied on foreign investment to supplement its domestic savings, the financial account normally records a surplus.

Direct investment is undertaken with the objective of obtaining a lasting interest in a foreign enterprise and exercising a significant degree of influence in its management. If a resident investor obtains 10 per cent or more of the ordinary shares or voting stock of a foreign enterprise, then this is deemed to be direct investment. Direct investment

Financial Account 2021	\$ billion
Direct investment	9
Portfolio investment	-64
Financial derivatives	-14
Other investment	16
Reserve assets	-3
Total	-58

enterprises include branches, subsidiaries and other businesses where the foreign resident has significant shareholding.

Portfolio investment consists of international equity and debt securities (mainly bonds and notes) not classified as direct investment. Portfolio investment is more short term in nature and speculative – the investor is not assumed to have any influence in the operation or decision-making of the enterprise. Other investment is a residual category that captures transactions not classified as direct or portfolio

investment. Other investment comprises trade credits, loans, currency and deposits. Reserve assets are those financial assets controlled by the Reserve Bank of Australia. Reserve assets include monetary gold, Special Drawing Rights (SDRs) and foreign exchange. In 2021, the financial account recorded a deficit of \$58 billion with the largest component being portfolio investment. Remember that a financial account deficit means that Australia invested more funds in foreign economies than foreign economies invested in Australia.

Balance of Payments	
	Balance on Current Account
+	Balance on Capital and Financial Account
+	Net errors and omissions
=	0

To obtain the overall balance of payments, the current account balance and the capital/financial account balance are added together. The total balance of payments must always sum to zero. This means that if the current account is in surplus (CAS), then the capital and financial account will be in deficit (FAD) and equal to the current account in absolute value (plus any net errors & omissions). In 2021, the current account recorded a surplus of \$69.7 billion, while the capital/financial account recorded a deficit of \$58.3

billion. This meant that the net errors/omissions figure was equal to -\$11.4 billion). While this figure is unusually large, it is gradually assigned to the relevant accounts as more information is collected by the statisticians.

11.6 The relationship between the current account and the capital/financial account

The balance of payments is an important set of accounts that summarise a country's transactions with the rest of the world. Changes in the balance of payments reflect changes in both the world economy and the Australian economy. The balance of payments is an important economic indicator providing information on a nation's trade account and its financial position with the rest of the world. Both the government and the financial markets use the balance of payments as a guide to analyse the relative performance of the economy. Changes in economic growth within Australia and in the world economy have an impact on a nation's balance of payments. The current account not only summarises the net movement of goods and services but also reflects changes in the financial account through the net income category. It is important to remember that the capital and financial account offsets changes in the current account and vice versa. For example, an increase in foreign investment into Australia will increase the financial account balance which will cause a decrease in the income balance in the current account in terms of greater servicing costs, thereby decreasing the current account balance.

A current account surplus will always be matched with an equivalent capital/financial account deficit.

Australia normally records a current account deficit and therefore a capital and financial account surplus. But from the June quarter 2019, Australia recorded successive quarterly current account surpluses and capital/financial account deficits. (a quarter refers to a three month period). The previous time Australia recorded a current account surplus was way back in 1975! Many countries, such as Japan, typically record a current account surplus and a financial account deficit. This reflects Japan's excess savings which it lends to other countries in need of financial capital. Australia has traditionally had a shortage of savings to fund its investment and has relied on overseas savings in the form of foreign investment. Australia is not a low saving country - it is just that Australia, with its relatively low population, does not generate enough savings to finance its large investment needs and so relies on foreign savings. Australia is a very resource rich country and requires large amounts of foreign investment to fund its economic development. This means that Australia will normally record a financial account surplus and a current account deficit. By borrowing savings from overseas sources to supplement domestic savings, Australia is investing in future higher incomes and living standards. Foreign investment has been beneficial to the Australian economy, increasing its rate of economic development and standard of living.

Many people believe that countries should aim for a current account surplus believing that a trade surplus should be an objective in its own right. But this is incorrect. It is impossible for every country in the world to record a trade or current account surplus. It is important not to make the mistake of referring to a trade or current account deficit as being 'unfavourable' and a trade or current account surplus as being 'favourable'. But how often have you heard the media report that *'Australia's*

trade account and/or current account deteriorated' when in fact they should report that the current account balance fell or the trade deficit increased. The media need to do a refresher course in basic economics.

Many people worry if the size of the current account balance decreases, believing that it is a sign of trade weakness or a sign of declining competitiveness. But this may not be the case. The balance of payments is affected by many different factors. It is influenced by changes in consumption, savings, investment, interest rates and exchange rates. A decrease in the size of the current account balance may be a sign of economic strength. For example, if the domestic economy is growing, then imports will automatically increase which will decrease the trade and current account balance. A surge in domestic investment will also lead to an increase in capital imports which will also decrease the current account balance. In both of these cases, a fall in the current account balance is a positive indicator that the economy is growing.

If the level of foreign investment into Australia increases, this will increase the financial account balance. This will generate increased outflows of income payments, such as interest and dividends, which will decrease the current account balance. Foreign investment flows into countries where profit opportunities are strong and economic prospects are positive. When the economy is weak and growing below trend, then foreign investment will fall. This happened in Australia during 2019-20 when the economy was in recession. There may be times when a decrease in the current account balance may be due to a fall in competitiveness due to an increase in production costs or an increase in the rate of inflation. In this instance, the fall in the current account balance is a sign that the economy is not performing well. The important point is to analyse the reason for the change.

Review Quiz

- 1. What is recorded in the financial account?**
- 2. Why does Australia usually record a financial account surplus?**
- 3. How will an increase in foreign investment into Australia affect the current account balance?**
- 4. Why will a surge in domestic economic growth decrease the current account balance?**
- 5. If the economy experiences a recession, what will happen to the current account balance?**

12

The role of government



Learning objectives

In this chapter, you will learn about

- *the role of government in a modified market economy*
- *the size of the government sector in the Australian economy*
- *the distinction between direct and indirect taxation*
- *the distinction between progressive, regressive and proportional taxation*
- *the concepts of equity, efficiency and simplicity in taxation*
- *the concepts of income and wealth*
- *income distribution in Australia*
- *the Lorenz curve and the Gini coefficient*

12.1 The role of government

The characteristics of the market economy were described in chapters 2-5 of this book. In a **free market system**, individuals and groups make decisions in their own private interest, for their own benefit. Consumers are able to buy any goods and services for which they are willing to pay the going price. Business firms make the products consumers want, and try to achieve the lowest costs of production to maximise profits. Competition brings about continual change and innovation to reduce costs and develop new products. The free market system uses the world's scarce resources in the most efficient manner possible. Why? Because it offers incentives for individuals to do the best they can, and allocates scarce resources to the highest bidder!

Competitive markets don't necessarily produce outcomes that support the social objectives of the community, however. A **market economy** would allocate resources efficiently, but not necessarily equitably (fairly). Private firms would not produce some types of goods and services because it is not possible to do so profitably. Some services that society regards as essential such as hospitals, education, and law and order would be under-produced by a free market. On the other hand, products using resources for which property rights are uncertain could be over-produced. This could mean that water, fishery, and forest resources would be exploited and depleted. In a free market, people, as a productive resource, would be rewarded according to their contribution to production. But this would mean that groups such as the sick and elderly may not be able to earn enough income to survive. Finally, it is likely there would be significant fluctuations in the level of economic activity because private decision-makers would be likely to over-react to market signals. As a result, the economy as a whole would feature economic 'booms and busts', each having potentially significant costs (such as asset price inflation and unemployment).

These days, the majority of the world's national economic systems are based on private ownership, free enterprise and markets, but they feature some level of government intervention to overcome the problems mentioned above. The term **modified market economy** is used to describe these economies, including Australia. In the following sections, we describe the nature and extent of government intervention in the Australian economy and the reasons for such intervention. Although Australia is the focus of this section, the discussion applies equally well to any developed economy.

In modified market economies, the economic roles of the government can be categorised as:

- the provision of public goods and services
- the redistribution of income
- the regulation of business enterprises
- macroeconomic management

The provision of goods and services

Essentially, people pay for **private goods** from their own pockets, which allows them exclusive rights of use. The free market will usually provide adequate amounts of private goods because consumers are willing to pay for their purchase, and producers are willing to produce them because there is a profit incentive. Governments have often been involved in the production and sale of private goods such as electricity, water, gas and communication. They did so for good reasons. Firstly, the supply of many of these goods required large amounts of expensive infrastructure. Imagine how much it would cost a private firm to establish a system of roads, power lines or water pipes for a city! Secondly, governments often thought they should provide infrastructure to prevent private owners taking advantage of a monopoly position and exploiting the buying public by charging excessive prices. Thirdly, governments have often owned and operated commercial businesses because they were **natural monopolies**, where it is more efficient for one firm to supply the whole market because it can take advantage of the economies of scale (the cost advantages that come about because of size). Examples of natural monopolies include water supply, electricity provision, and some forms of transport (e.g. rail).

Observant readers will notice that much of the previous paragraph was written in the past tense. Many governments have stepped away from providing goods and services that could be provided by private firms. Why? Perhaps public resources were being wasted by having huge sums of money tied up in these operations? Perhaps the public businesses were not run as efficiently as they could be in private hands? Perhaps the government should not be involved in producing goods that the private sector could provide for itself? These questions prompted governments in many countries to sell public corporations to private owners. This transfer from public to private ownership was called **privatisation**.

Australia's privatisation program, the bulk of which took place in the 1990s, was one of the largest in developed countries – second only to the UK in terms of total value, and to New Zealand as a proportion of GDP. The government entities that were privatised became private firms that now compete on an equal footing with other private firms in their markets.

Left to their own devices, private providers would not provide enough of some of the essential goods and services we need as individuals or as a society. In chapter 5, we noted some goods do not have prices, which means that these goods will not usually be produced by markets.

Public goods are essential for our welfare as a society, and are generally provided by the government and financed by general taxation revenue. Private enterprise has no incentive to provide public goods because they cannot be priced and sold in a market (because property rights are shared), and hence they cannot be profitable. It would be virtually impossible to exclude non-paying customers from consuming these goods. These non-paying

Public goods and common resources suffer from the 'free rider' problem because these goods are non-excludable.

The Grand Banks fishery off eastern Canada was regarded as an endless supply of cod fish. Advances in fishing technology in the 1960s allowed huge catches, and attracted many new boats to the industry. The first sign that the fishery was under pressure was when fishermen were forced to sail further to maintain their catches each season. By the 1990s, cod populations had fallen so much that the Grand Banks fishing industry collapsed. The ecosystem may never recover.

customers are referred to as **free riders** - consumers who enjoy the benefits of consumption without paying for the cost of provision.

Common property goods share the non-excludable characteristic of public goods but are rival in consumption. The ocean and the atmosphere are good examples. Ownership of these 'goods' is universal - there are no clearly defined private property rights. As a result, common property goods are often over-consumed. Fishing is an example. Because the number of fish in the ocean is rival, over-fishing can drastically reduce the available stock. The overuse of common resources is sometimes referred

to as the 'tragedy of the commons'. A private dam or stream does not suffer from this problem because property rights can be enforced, and the owner has an incentive to maintain the resource for the future.

The environment is basically a **free good**. Virtually all environmental goods or resources are either public goods or common property goods. The environment is non-exclusive - this is why the free market fails to preserve and look after the natural environment. Public goods are non-rival up to a threshold. Once that threshold level is breached, then they can become rival and turn into a common property good - for example the atmosphere. Once air pollution exceeds the atmosphere's absorption capacity, from an environmental point of view, it would seem more appropriate for society to base allocation decisions on social costs rather than private costs. However, doing so involves a measurement problem. Including social costs and benefits in pricing decisions is difficult because many of the values cannot be quantified in dollar terms. Common property goods therefore require government to act as protector and regulator, to manage and help control the use and abuse of commonly-owned resources. One of the reasons the government must protect environmental goods is that we have imperfect information about the social value of the good, both in the current period and, especially, the future.

Another category of goods that the government often provides is **merit goods**. Merit goods are essentially private goods that, as their name implies, are associated with positive externalities. Good examples are education and health services. Both are made available (at a price) in private markets, but if supply was left completely to the free market, it is likely that there would be significant under-consumption of these goods. Why? Because the value many individuals place on these services is less than the value society places on them. Not everyone can afford private education or expensive hospital and medical bills. The substantial social benefits associated with merit goods often results in the government intervening to supply these goods at a heavily subsidised price to encourage greater community consumption.

For public goods, common property goods and merit goods, government intervention positively affects the allocation of resources to meet social objectives.

Regulation of business enterprise

Regulation of business activity is a feature of all developed economies. Regulation is all around us, as illustrated by rules imposed on food, liquor and pharmacy businesses in the local shopping centre; on schools, health care and public transport; in the workplace; and in the media.

Many regulatory mechanisms are direct, in the sense that they are set down as laws or regulations which must be complied with. Regulations tend to have three elements:

- statutes, standards or statements of expectations
- a process of registration or licensing to approve and to permit the operation of a service
- a process of inspection or other form of ensuring compliance with standards, including reporting and management of non-compliance with these standards

Indirect policies are based on incentives or disincentives that encourage (or discourage) participants in a market. These include the **subsidies** and **taxes** that are levied to encourage producers and consumers to change their behaviour (taxes on alcohol and tobacco being a good example). Other policies allow some degree of non-compliance (for which there is a charge) then setting up a market so participants can trade their obligations (as in, for example, emissions trading).

In general, **regulation** is an important and effective mechanism to achieve economic, environmental and social goals. It is essential to ensure the rights of business employers, employees, customers and the general public.

Some industry groups 'self-regulate' – members agree on accepted codes of behaviour, and are 'coerced' by the group to meet these standards. For example, AFL and NRL clubs have codes of behaviour to ensure that players don't damage the image of their sports, and therefore their economic viability.

Business firms are subject to a huge number of regulations and a wide variety of standards in areas such as advertising, occupational health and safety, taxation, and workplace relations. Examples of agencies that regulate business activity in our economy are shown in figure 12.1 (the list is by no means exhaustive).

From a business perspective, government regulation involves a number of direct and indirect costs. Direct costs include the time it takes to do activities such as paperwork or applying for permits, as well as any costs associated with hiring advisors or paying fees and charges. Indirect costs could occur, for example, if regulation distorts business decisions or restricts the flexibility firms.

To operate a café (with a liquor service) in Perth, a proprietor would require one principal licence (ABN) and up to 22 others related to company registration; employment; food service; import of food; the service of liquor; the playing of music; taxation and disposal of waste!

To operate as a mortgage broker, working from home, the business owner requires three principal licences, and possibly five related licences or registrations.

Figure 12.1 Australian regulatory authorities - examples

Name of Regulator		Function
ACCC	Australian Consumer and Competition Commission	"Our role is to protect, strengthen and supplement the way competition works in Australian markets and industries to improve the efficiency of the economy and to increase the welfare of Australians.."
CASA	Civil Aviation Safety Authority	"The Civil Aviation Safety Authority is a government body that regulates Australian aviation safety. We license pilots, register aircraft, oversee and promote safety."
AER	Australian Energy Regulator	"regulates energy markets and networks. The AER is committed to promoting outcomes that are in the long term interests of consumers."
APRA	Australian Prudential Regulation Authority	"APRA uses a broad range of tools to supervise financial institutions and promote the stability of the broader financial system"
ASIC	Australian Securities and Investments Commission	"We have a number of regulatory tools available to us to address the risks and harms that threaten good consumer outcomes and fair and efficient markets."
FIRB	Foreign Investment Review Board	"examines proposals by foreign persons to invest in Australia and makes recommendations to the Treasurer."
TGA	Therapeutic Goods Administration	"responsible for regulating therapeutic goods including medicines, medical devices, blood and blood products."
ACMA	Australian Communications and Media Authority	"responsible for the regulation of broadcasting, the Internet, radio communications and telecommunications."

Why is there a need for so much regulation? Isn't it just red tape and bureaucracy? Doesn't it increase the costs of doing business? That is definitely true, so the relevant question is 'what is the right amount of regulation?' Economic principles suggest the optimum amount of regulation where the benefits are just equal to the cost of imposing the regulation. In other words, authorities should only impose more regulations if they think the gains exceed to costs of bringing in the regulation.

Governments in most developed countries are grasping with the challenge of reviewing and reforming their regulatory management systems. Australia's Productivity Commission conducts regular reviews of regulations in the economy, recent examples being water resources regulation and transport regulation (2020-21). The Council of Australian Governments (COAG) is working towards a 'seamless national economy' – intergovernmental agreements and nationally uniform codes in such areas as transport regulation, higher education, child care, building regulation and energy markets.

The economy benefits from having effective regulations, even if exact outcomes are difficult to quantify. The costs and benefits of regulation are often difficult to 'monetise', and the costs are often paid 'up-front', with benefits accruing over a longer period of time.

Redistribution of income

If resource allocation was determined by market forces, the economy would theoretically operate in a very efficient and flexible manner. All questions regarding resource allocation would be answered by the **invisible hand** of the price mechanism. Relatively scarce items would have high prices in both factor and final markets.

The **standard of living** (share of the proceeds of resource use) that any member of the community could attain in a free market economy would depend upon the relative scarcity of the resources that person could contribute to the production process (be it land, labour, capital or enterprise). The owner of land could expect to receive rent for that land; owners of capital would receive dividends; and providers of enterprise would be entitled to profit. All of these payments would reflect the price which the market was prepared to pay for knowledge, skills or resources at any time.

In our community, however, not everyone is able to contribute resources to the production process. The aged, the sick and the handicapped, for example, would be unable to earn much income in a market economy, so they would have difficulty satisfying their basic needs. Similarly, workers with low skills and training would have limited earning (and thus spending) potential.

This explains the second of the economic roles of government in our society – to redistribute income from the wealthy to the poor in order to support those who would otherwise find it difficult to maintain a minimum standard of living. Commonwealth, state and local governments all participate in the provision of welfare services. In 2021-22, the federal government allocated 34 per cent of its annual budget to this area, although that was more than normal due to Covid-19. Over two and a half million Australians are recipients of some form of direct welfare payment. Government benefits are also available to high income earners, mainly through assistance with education and health expenses (indirect payments or payments-in-kind).

Perhaps more could be done? Should all inequalities be removed? Like all economic issues, the optimal degree of income redistribution comes about where the benefits to be gained from redistribution equal the costs of redistribution.

Macroeconomic management and the business cycle

Western governments have played an active role in macroeconomic management since the 1950s. The development and use of policy measures to reduce the fluctuations in economic activity associated with the business cycle came about as a result of the popularisation of 'Keynesian' economics during the 1940s and 1950s. Governments typically use **fiscal policy** and **monetary policy** to try to influence business cycle fluctuations.

Review quiz

- 1. List the economic roles of government in a modified market economy.*
- 2. Explain the difference between a private good and a public good.*
- 3. Describe two of the three reasons why governments may provide private goods.*
- 4. Explain the meaning of the term 'common property good'. Give three examples.*
- 5. Which type of merit goods are often provided by government? Are they priced?*

The size of the government sector

There are a number of ways in which the size of the public sector might be measured – revenue, expenditure and workforce being obvious ones. In Australia, the number of public sector employees in 2021 was just over two million (ABS), about 80 per cent of whom employed in state governments, 12 per cent in the Commonwealth government and 8 per cent in local governments. The government sector produces about a fifth of all the goods and service produced in the Australian economy each year. Government or its agencies own about a fifth of the transport and construction industries; communication; electricity, gas and water services, but less than 10 per cent of industries such as finance, manufacturing and agriculture.

Australia has a three-tier system of government. Each tier has different responsibilities. National governments take on broader functions such as defence, foreign affairs, international trade, currency and banking regulation and the provision of welfare. Over ninety per cent of the funds required come from taxation (on personal income, company profits and goods subject to excise). State or territory governments (in Australia there are eight) are usually responsible for the provision of law and order, health, education and transport. The majority of state revenue comes from Commonwealth transfers, but there are also state taxes, such as the GST (levied by the Commonwealth); payroll tax; land tax; stamp duties on transfers of assets such as property; and motor vehicle taxes). Local and municipal governments (of which there are more than 700 throughout Australia) are typically responsible for functions such as urban planning, refuse collection, and the maintenance of parks and gardens for areas of varying size – sometimes just a few suburbs. Most of their activities are funded by rates paid by landowners in the local government area (LGA), supplemented by federal and state government grants.

12.2 Australia's taxation system

Most people complain about having to pay tax, even though they recognise that taxation finances a wide variety of goods and services that are essential for the operation of the economy and civil society. **Income tax** has been the major method

of raising government revenue since the late 1930s. Prior to that, the bulk of taxation was levied on sales of goods; property holdings; and customs duties. Uniform income taxation laws came into force in Australia in 1942, when the Commonwealth government took over the collection of income tax from the states.

Apart from raising revenue, the taxation system plays an important role in:

- the redistribution of income from the wealthy to the poor
- influencing how resources are allocated among competing uses
- regulating the economic fluctuations associated with the business cycle

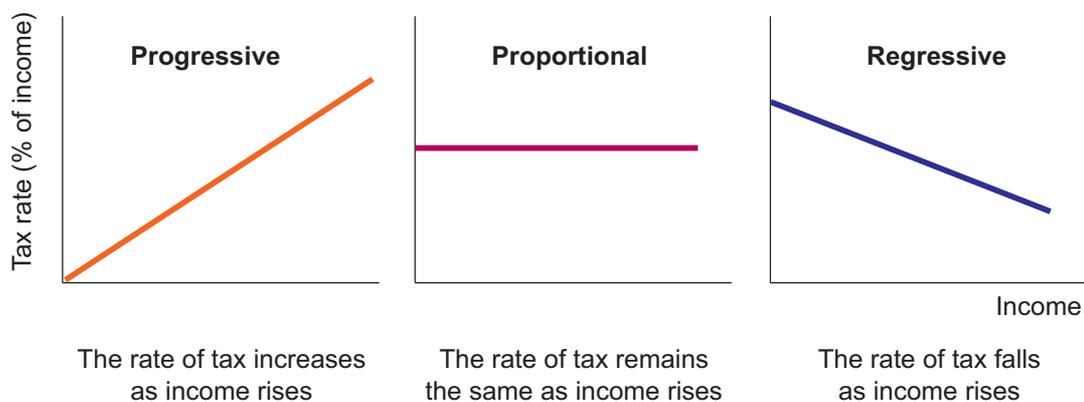
Tax concepts

Taxes can be classified according to their impact and incidence. **Impact** means 'where the tax is levied or collected' and **incidence** means 'where the burden of the tax falls' – in other words, who pays the tax.

Another way to classify types of taxation is to describe from whom they are collected. **Direct** taxation is collected from the taxpayer's (individual or corporate) income, so the impact and the incidence of direct tax fall on the same person. **Indirect** taxation such as excise tax and the Goods and Services Tax (GST) are collected from consumer spending on a wide range of products. The impact and incidence of indirect taxes fall upon different people. With excise taxes, for example, the seller or producer of the good pays the tax, but then passes it on to the consumer through higher prices. The seller collects the tax, but it is actually paid by the consumer.

We can also classify taxes according to how they are levied. **Progressive** taxes claim an increasing proportion of income as income increases. The burden of a progressive tax falls mainly on those who earn higher levels of income. The actual relationship between income and tax rates is not quite as direct as shown in figure 12.2. Australia, like many other countries, has a system of income tax 'brackets' which create a 'stepped' relationship between income and tax rates.

Figure 12.2 Three ways taxes are levied



Regressive taxes, by contrast, place a greater burden on lower income earners, because they take a decreasing proportion of income as income increases. Consider an excise tax levied at a flat rate on an item such as a box of chocolates. The low income earner will pay the same dollar value of tax on the chocolates as does the high income earner. To the low income earner, however, the tax is a higher proportion of their income.

Proportional taxation takes a constant proportion of income, no matter what level has been earned. The main example of a proportional tax in Australia is company tax, where large companies currently pay tax at the rate of 30 per cent of their profits and 'small' business firms pay 27.5 per cent.

Two other distinctions should be defined. 'Specific' taxes are charged on the volume of sales, regardless of price. 'Ad valorem' taxes are levied as a percentage of price.

Having outlined the types of taxation, it is important to understand the **principles** on which a tax system might be judged. The criteria against which any change to the tax system should be judged probably boils down to a simple question "is it fair, is it simple, and is it efficient?" These principles are not new. Adam Smith's "An Inquiry into the Nature and Causes of the Wealth of Nations" (1776) outlined four basic criteria to use in determining how 'good' a taxation system is. Smith's 'Canons of Taxation' were equity, economy, certainty and convenience. A taxation system that achieves these characteristics will help improve the standard of living, because it will efficiently provide revenue for the government at minimal overall cost to taxpayers.

Fairness can also be called **equity**. A 'good' tax system will feature both horizontal and vertical equity. Simply put, taxpayers who earn the same amount of income should pay the same amount of taxation (**horizontal equity**), and taxpayers who have a greater ability to pay tax should pay higher amounts of tax (**vertical equity**).

A good tax system should be relatively **simple**. This can be interpreted in two ways. Firstly, all participants in the system should be able to understand what taxes they are obliged to pay, and how much they are liable to pay. Secondly, the process of collection should be as convenient as possible for both taxpayers and the collectors.

Finally, the tax system should be **efficient**. The benefits of the tax must outweigh the costs of its collection. This is the same principle we apply to all other economic decisions – go ahead with an activity if its benefits outweigh its costs. An economical tax must minimise 'excess burden', which occurs if the tax distorts decision-making or operates in a discriminatory manner. Consider two products, A and B, which are popular consumer items with similar characteristics (e.g. beverages). If A was taxed, but B wasn't, rational producers would produce more of B because sales revenue would be greater at the lower, non-taxed, price. This would provide them with an unfair advantage compared to producers of good A.

Types of taxes

Government finance statistics identify five different **tax bases**: income (3 sources); goods and services; and property and wealth.

Taxes on income

Personal income tax is levied on all wage and salary income, at rates which specify how much of the last (marginal) dollar will be paid as tax. Personal income tax is direct, as the impact and incidence of the tax both fall on the same person. Income tax has a progressive burden, as marginal rates of tax rise as income rises. People on higher incomes pay more tax, both in money terms, and as a proportion of their income. For example, a taxable income of \$30,000 for the tax year 2021-2022 attracts taxation of \$2242 (an average rate of tax of 7.5 per cent). A person earning \$60,000 is required to pay \$9,967 in tax (16.6 per cent of their income), and a gross income of \$90,000 would attract a tax of \$19,717 or 21.9 per cent of income. Someone on \$150,000 pays 27 per cent of their income in tax. These calculations do not include the Medicare surcharge – a 2 per cent levy to finance the Medicare health scheme.

Company tax is a proportional tax whose impact falls on the individual company, even though the incidence probably falls on consumers, because the tax is a cost of production that is passed on to buyers. Companies with turnover less than \$50 million pay 25 cents in the dollar.

Fringe Benefits Tax (FBT) is levied (at the highest marginal tax rate) on the value of non-cash benefits given to employees as part of their salary package (such as company cars, school fees for children, and low interest loans). FBT was introduced in the mid 1980s in the interests of vertical and horizontal equity – the notion that people should pay tax according to their ability to pay, and those on the same income level should pay similar amounts of tax.

Taxes on the provision of goods and services

Beginning in the 1930s, Australia applied regressive Wholesale Sales Taxes (WST). The rate of sales tax applied depended on how 'luxurious' the good was. Many 'essential' items, such as food and books, were exempt from sales tax. To this extent, WST helped to achieve vertical equity. On the other hand, the WST was not levied on services. As the WST was 'concealed' in the price of the good, the consumer rarely knew how much she was paying to the taxman. Sales taxes are regressive, in that the same dollar amount of tax is paid when buying a taxed item, irrespective of the income earned by the payee.

The **Goods and Services Tax (GST)** is a broad-based tax levied at ten per cent of the price of most goods and services consumed in Australia. The GST replaced the WST

Marginal rates of tax	
Income \$	MRT
2005-2006	
0-6,000	nil
6,001-21,600	17
21,601-63,000	30
63,001-80,000	42
>8,0000	47
2009-2010	
0-6,000	nil
6,001-35,000	15
35,001-80,000	30
80,001-180,000	38
>180,000	45
2021-2022	
0-18,200	nil
18,201-45,,000	19
45,001-120,000	32.5
120,001-180,000	37
>180,000	45

Source: Australian Tax Office, 2021.

on 1 July 2000. The impact of the GST falls on the seller of the good or services; the incidence (burden) falls on the consumer. GST revenue is collected by the federal government and distributed to state governments. It is thus regarded as a 'state tax'.

Excise duties are imposed at a flat rate on domestically produced goods such as alcohol; cigarettes; oil products; and LPG (gas). Excise raises a great deal of revenue for the government, often without affecting consumption patterns because they

Excise tax rates	
Good	Tax rate
Petrol	43.3 c per litre
Diesel fuel	43.3 c per litre
Cigarettes	\$1.10 per stick
Brandy	\$88.91 per litre
Beer	\$52.49 per litre

Source: Australian Tax Office, 2021

are levied on price inelastic goods (i.e. the quantity demanded is unlikely to fall by as great a proportion as the increase in price caused by the tax). Apart from their revenue-raising function, these taxes are intended to reduce the social costs / externalities that these types of consumption may have on the community. **Customs duty** is an indirect tax levied on imported goods (i.e. a tariff), often as a means of protecting Australian producers from overseas competition.

Taxes on property and wealth

Capital Gains Tax (CGT) is a progressive tax which is levied on capital gains (profits) from the sale of assets held for a period longer than 12 months (any asset sold within 12 months is subject to tax at the income earner's normal marginal rate). The CGT burden is adjusted for inflation, so any capital gain on the sale of an assessable asset is reduced to account for inflation over the period it has been held. The CGT does not apply to assets purchased before September 19, 1985, nor to 'personal items' such as houses, cars, or boats. CGT applies to shares, investment properties, business goodwill, and some personal items if they were purchased with the intention of resale (e.g. jewelry).

Resource taxes

The growth and profitability of the minerals sector in Australia has raised a number of equity issues about whether profits generated from the extraction and sale of non-renewable resources should be taxable. A Petroleum Resource Rent Tax was levied on off-shore petroleum extraction activities in 1987, and was extended to on-shore extraction in 2012. A Minerals Resource Rent Tax (MRRT) was introduced in that year, but limited to iron ore and coal mining. The tax was abolished in 2014 due to controversy about its impact on business investment and its inefficiency - it raised very little revenue. A number of countries apply resource rent taxes (RRT). In theory, they are progressive, neutral and equitable:

- the tax revenue share increases as the resource rent increases so the tax is based on ability to pay
- the tax will neither encourage or discourage investment, and will not affect investor decisions on production, consumption or trade
- as natural resources belong to the public, some of the profits derived should be returned to the public

In a similar vein, some countries now levy ‘ecotaxes’ in an attempt to address environmental **market failure**. A **carbon tax**, for example, is a tax levied on the carbon content of fuels, and works on the theory that higher prices discourage consumption of carbon and encourage cleaner energy sources – one of the main drivers of low-carbon innovation is the price of energy. See also chapter 13. Australia had a carbon pricing scheme (between 2012-2014) that required firms that emit over 25,000 tonnes per year of carbon dioxide equivalent greenhouse gases to pay \$23 per tonne of emitted gases. As carbon dioxide emissions are mainly produced by electricity generation, petroleum refining and gas processing, the tax increased the prices consumers pay for these products, theoretically reducing demand and cutting emissions.

The Government proposed an **emissions trading scheme** (ETS), in which firms would buy permits (carbon credits) to cover the amount of their emissions. They could then trade the permits, creating a market in which the buyer is paying a charge for polluting, while the seller is being rewarded for having reduced their emissions. In theory, those who can reduce emissions most cheaply will do so, thereby reducing pollution reduction at the lowest cost to society.

Tax reform

Over the last forty years, Australia’s taxation system has seen many changes to address issues of efficiency and equity. These included the Capital Gains Tax (1985); Fringe Benefits Tax (1986); the introduction of the GST in 2000; and self-assessment of tax liability (the tax office relies on information provided by the taxpayer and no longer checks all tax returns). **Tax reform** remains an area of controversy, however. Even when arguments for reform are solid, governments of all persuasions find it a politically difficult task.

Review quiz

- 1. Describe the impact and incidence of personal income tax, and company tax.**
- 2. Distinguish between progressive and proportional taxes. Provide examples.**
- 3. Outline the impact, incidence and burden of company tax, fringe benefits tax and an excise tax such as tax on tobacco.**
- 4. Compare Adam Smith’s ‘canons of taxation’ with the three characteristics of a ‘good’ tax system**

12.3 The distribution of income

Income and wealth

Income and wealth are different concepts – one represents a flow of funds, the other a stock of assets. They are closely linked, however, because the more income

a household has, the greater its capacity for building wealth over time. Figure 12.3 illustrates the key elements of 'income'. Most households have one or more sources of private income (e.g. wages and salaries, income from an investment, income from superannuation funds). Gross income is determined by adding any transfer payments a household receives from government, such as a pension or allowance. Direct and indirect taxes are deducted to determine disposable income. Most households also receive some form of indirect benefits (social transfers) such as assistance with school fees or health care costs, which add to final income.

Wealth, on the other hand, refers to the current value of the assets a household has accumulated over time through savings; financial investments; business dividends; and inheritance. Wealth is the difference between a household's assets and its liabilities. Household assets are generally held as property, shares, savings and superannuation, while liabilities include mortgages, personal loans and credit card debt. The mean household worth of the 'poorest' 20 per cent of households was \$35,200 in 2017-18; the wealthiest 20 per cent had average wealth exceeding \$3.2 million! Overall, average household wealth was \$1 million!

The distribution of income

Very few Australians live in **absolute poverty** (a situation in which people live below a subsistence level of income). About 20 per cent of Australians live in **relative poverty**, however, meaning they do not achieve what our society defines as minimum standard of living. Figure 12.4 shows the distribution of household disposable income in Australia for 2017-18. The distribution of income is asymmetric – a small proportion of people have high household income and a larger number of people have lower incomes. The data is in 'equivalised' terms – adjusted for household size. The distribution of income has become flatter over the last 10 years – a smaller proportion have low incomes, but a higher proportion earn higher incomes! The mean disposable income (\$1062 per week) is higher than the median (\$899) – to be expected as the small number of households that earn very high incomes distort the distribution.

Figure 12.3 Income concepts

Income from personal exertion is private income. For some, private income is supplemented by direct welfare payments and/or cash benefits. Income is taxed (direct tax), as is expenditure (indirect tax).

Nearly all households' disposable income is supplemented by indirect benefits - subsidies and concessions for education, health and childcare.

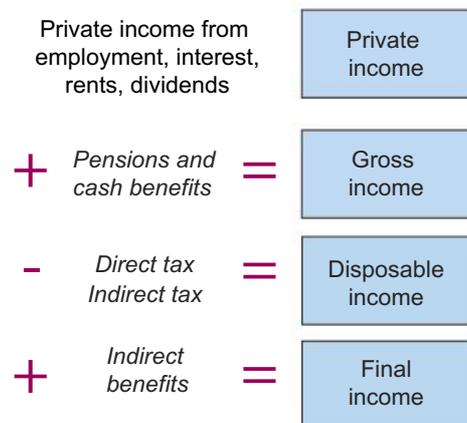
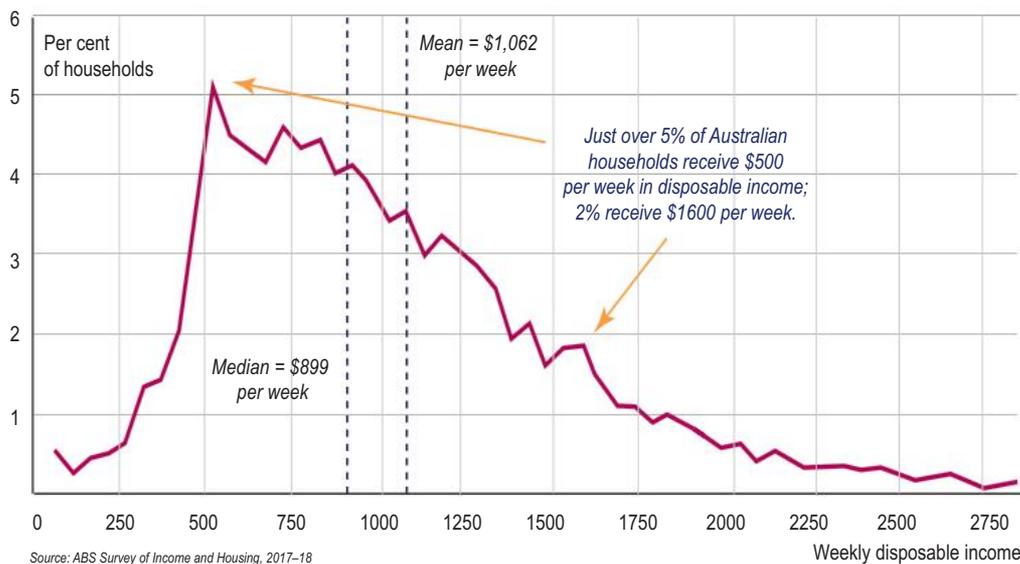


Figure 12.4 Distribution of household income, 2017-18

Economists apply a number of measures when discussing income and wealth patterns. One of these is the **Lorenz Curve**, which maps the cumulative proportion of the population, ranked by income, against their cumulative share of income. The Lorenz Curve drawn in figure 12.5 is based on Australian Household Income data from 2017-18. The horizontal axis shows the cumulative percentage of population, while the vertical axis measures the cumulative percentage of income. The diagonal line in describes perfect equality of income. If everyone in the economy had an equal income, then the bottom 20 per cent of the population would receive 20 per cent of total income, the next 20 per cent of the population would also receive 20 per cent of income, and the top 20 per cent would also receive 20 per cent of total income.

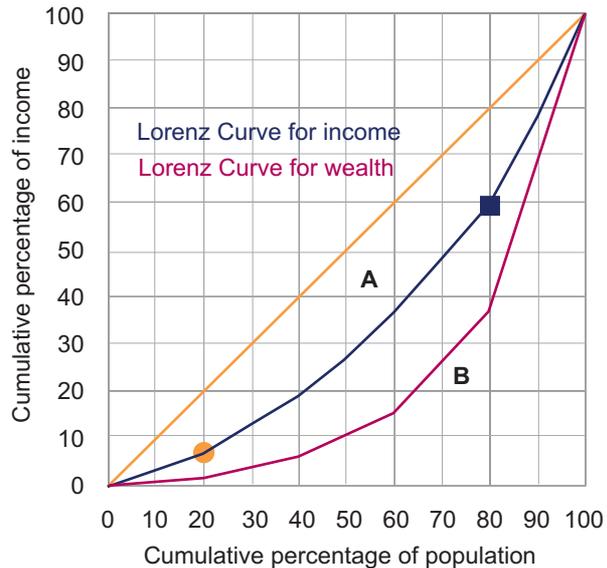
Whenever some degree of income inequality exists, the Lorenz Curve will bow outwards, moving south-east of the diagonal line. The further the curve lies from the diagonal, the greater the inequality of the distribution of income. Any point on the curve shows the proportion of income earned by a given proportion of the population. The circle on the blue line shows that the lowest (poorest) twenty per cent of the population (x-axis) earned just 7.5 per cent of total income in 2017-2018 (y-axis). The square shows that 80 per cent of the population cumulatively earned around 60 per cent of income – in other words, the top 20 per cent of the population earned 40 per cent of total income!

The Lorenz Curve for wealth shows more inequality - the top quintile of wealth-holders hold over sixty per cent of total wealth - the lowest just 0.7 per cent! Economists also use a measure called a **Gini coefficient** (or Gini Index) to measure the degree of income inequality in a country. The coefficient is the proportion of the area to the south-east of the diagonal that is accounted for by the area between the Lorenz Curve and the diagonal. The result is a number between 0 and 1. A society in

Figure 12.5 The Lorenz Curve

The Lorenz Curve can be used to illustrate income or wealth distribution. If income was distributed equally, the Lorenz Curve would be the diagonal straight line. The blue line indicates the degree of inequality in income Australia in 2017-18. The orange circle shows that the lowest 20% of income earners in Australia earned 7.5% of total income. The blue square shows the top 20% of income earners earned 40.4% of total income. The crimson line is a Lorenz Curve for wealth in the same year. The Gini index for income is region A / A+B. This index was 0.31 in 2017-18.

Source: ABS 6523.0 - Household Income and Income Distribution, Australia, 2017-18.



which income was equally distributed would have a Gini coefficient of zero. Absolute inequality, on the other hand, would yield a Gini coefficient of 1. In the last 20 years, Australia's lowest Gini coefficient was 0.291 (2004, 2009) and the highest was 0.32 (2007). Income equality in Australia increased between 1950 and 1980, declined over the next two decades, and has since remained fairly steady (0.31 in 2017-18).

Like all statistics, the Gini coefficient may not always tell an accurate picture. Consider country X in which the top 50 per cent of the population receives all the income earned in equal amounts (that is, total income is distributed equally amongst 50 per cent of the population). The Gini coefficient for country X would be 0.5. In country Y, where 25 per cent of all income is earned equally by 75 per cent of the population with the remaining income earned equally by 25 per cent of the population would also have the same Gini coefficient – 0.5. Country Y would be judged to have a more even distribution of income.

A number of explanations can be offered for the apparent inequality in income and wealth in the Australian economy: These include:

- personal traits (physical characteristics; personality and talent; attitude to risk-taking; knowledge and skills)
- occupational conditions (e.g. required education and training, work responsibility; hours worked; presence of danger; geographical location)
- opportunity (e.g. socio-economic and family background, access to higher education)
- other factors (e.g. sickness; disability; age; involuntary unemployment; and 'luck')

Income redistribution

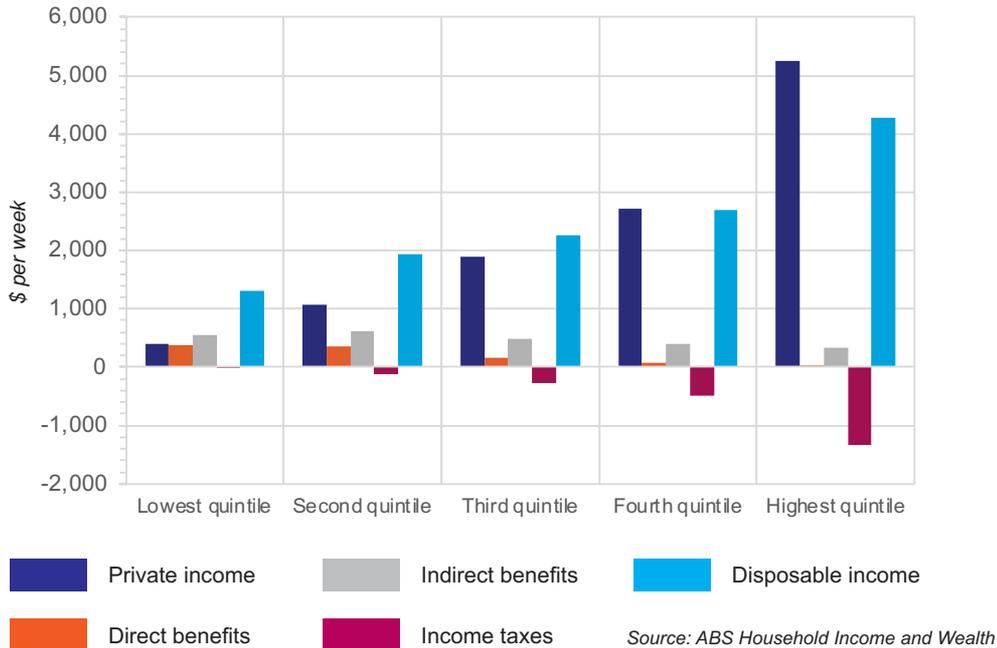
In Australia's modified market economy, one of the reasons for government intervention is to redistribute income (and wealth, to a lesser extent) from the rich to the poor, the aim being to ensure that all people in Australian society can achieve a reasonable minimum standard of living. The key element of **income redistribution** is **direct taxation**. Personal income tax is progressive, so high income earners pay a greater proportion of their income in tax than low income earners. For example, a taxable income of \$30,000 for the tax year 2021-22 attracts taxation of \$2242 (an average rate of tax of 7.5 per cent). A person earning \$60,000 is required to pay \$9,967 in tax (16.6 per cent of their income), and a gross income of \$90,000 would attract a tax of \$19,717 or 21.9 per cent of income. Someone on \$150,000 per annum pays 27 per cent of their income in tax.

The government also uses its spending powers to redistribute income. Direct **transfer payments** (pensions and welfare benefits) provide cash support for a number of groups of Australians - the aged; the unemployed; the sick and disabled; sole parents and children (family allowance). Social security and welfare accounts for the greatest proportion of Commonwealth Government spending in Australia - usually about 40 per cent of the Budget. **Indirect government payments** (social transfers in-kind) also redistribute income from the highest earners to the lowest. Public services like education, housing and health are provided at less than their full cost, as they are subsidised by government. These subsidies help to redistribute income and enable all Australians to have access to basic services. If these services were provided by the market, it is likely that some households would not be able to afford them, so they would be **underconsumed** - fewer people would obtain educational qualifications, find housing or be able to seek medical treatment.

Figure 12.6 illustrates the effect of government taxes and benefits on income distribution in 2017-2018. The private income of people in the first income quintile (the lowest one-fifth of income earners) is supplemented considerably by direct and indirect benefits, and they pay little taxation, bringing their final income to just over \$1200 p.w. At the other end of the scale, people in the highest income quintile pay a significant proportion of their income in taxation, but still receive some indirect benefits. The final disposable income of this group is \$4200 p.w. In broad terms, the private income of those in the top income bracket is 14 times that of people in the lowest quintile, but income redistribution policies mean final income is about 3.5 times as high!

A very small proportion of the Australian population lives in desperate poverty today - much smaller than would be the case if there were no redistribution policies in place in the modified market. But government benefits are also available to high income earners, mainly through subsidies for education and health expenses.

Should all inequalities be removed by income redistribution? Like all economic issues, the optimal degree of income redistribution comes about where the extra benefits to be gained from redistribution equal the extra costs of redistribution. It

Figure 12.6 *Income redistribution in Australia 2017-18*

may not be sensible to impose higher tax rates on people who appeared well-off if such a tax removed the incentive to work and create wealth. On the other hand, people receiving higher JobSeeker benefits during the early period of the pandemic in 2020 noted that they could actually save some money each fortnight, and thus felt much more positive about their economic situation.

Review quiz

1. Describe the difference between income and wealth; gross income and disposable income.
2. Draw two Lorenz Curves, one of which has a relatively equal distribution of income, and the other has an unequal distribution.
3. How does direct taxation (such as income tax) help to redistribute income from the wealthy to the poor?
4. What factors might explain income inequality?

13

Macroeconomic performance



Learning objectives

In this chapter you will learn about:

- *the economic objectives of the Australian Government*
 - *sustainable economic growth*
 - *low unemployment (full employment)*
 - *low inflation (price stability)*
 - *a more equitable distribution of income*
 - *the efficient allocation of resources*
- *trends in, and influences on, Australia's recent economic performance using a range of economic indicators*
- *the impact of recent domestic and international events on the performance of the Australian economy*

Chapter 12 introduced the roles the government undertakes in the economy, including:

- the provision of public goods and services
- the provision of welfare services
- the regulation of business enterprises
- macroeconomic management

This chapter introduces the concept of macroeconomic management, and will:

- describe the government's macroeconomic objectives
- describe Australia's recent macroeconomic performance
- outline the impact of selected recent international and domestic events on the economy

13.1 Economic objectives

We can think of economic objectives as 'performance targets' for the whole economy. Three of those targets constitute the key **macroeconomic objectives** – economic growth, price stability and low unemployment. The government also wishes to achieve a more equal distribution of income (as discussed in chapter 12) and to improve economic efficiency.

The 'rule of 72' is a shortcut that can be used to estimate how long it would take for any amount to double in size at different rates of change. For example, a \$1000 bank account receiving 6% annual compound interest would double in 12 years ($1000 \times [72/6]$).

Economic growth is the increasing capacity of the economy to satisfy the material wants of its members. As discussed in chapter 7, growth is typically measured by the rate of increase in GDP over time. The current rate of growth is important in defining the economy's future 'opportunity set' – the objective being a higher standard of living in the future. An economy would double in size in just over fourteen years if the growth rate was 5 per cent per annum, whereas it would take 24 years to achieve the same result if annual growth was 3 per cent!

Until the 1970s, most people wanted rapid economic growth. Since then, the emphasis has gradually shifted towards achieving **sustainable growth** – a rate of growth that can be maintained without creating other significant problems now or in the future. The notion of 'sustainability' recognises that there is a trade-off between growth today and living standards in the future. Essentially, the notion of a sustainable economy is built around the idea that the economy functions within the ecosystem, so resources must be managed so they are not depleted, and so they will be available for future generations. The focus has been on the natural resource, but the concept of sustainability is also relevant for human and capital resources. As we recall from chapter 5, many economic activities result in **negative externalities**, and the notion of sustainability is also about capturing those costs and ensuring those who benefit from economic growth have paid the true or full price of achieving it.

The nature and extent of the trade-off between growth and future is being reduced by business firms seeking opportunities in new markets; technological change; and education and government regulation, but there is a sense of urgency about achieving sustainability on many fronts – climate change; water supply and food security being key examples.

Developed economies now regard a growth rate of 3 to 3.5 per cent per annum as being a reasonable target. That's sufficient to achieve an acceptable rate of unemployment if population increase is in the 1.5 to 2 per cent range, yet not high enough to create pressure on prices. Recall that unemployment and inflation are typically regarded as the 'twin macroeconomic evils'.

Full employment occurs when everyone who is willing to work can find employment. As discussed in chapter 10, it is not possible to achieve a zero rate of unemployment due to the existence of job search and structural change. Full employment is now synonymous with the **natural rate of unemployment**, which in Australia is estimated to be around 4.5 per cent of the labour force. Cyclical, or demand-deficient, unemployment will add to this 'base rate' during periods of slower growth. Between 2015 and 2021, Australia's average annual unemployment rates were between 5.5 and 6 per cent.

Price stability refers to maintaining a low inflation rate over the business cycle. The Reserve Bank of Australia (RBA) has had an explicit inflation target since 1993:

"In pursuing the goal of medium-term price stability, both the Reserve Bank and the Government agree on the objective of keeping consumer price inflation between 2 and 3 per cent, on average, over the business cycle".

Source: RBA Statement on the Conduct of Monetary Policy, September 2010

Inflation has been a consistent feature of the world economy for hundreds of years. Most people accept a moderate and steady rate of inflation over time. High rates, however, have adverse effects on real income for both households and firms; international competitiveness; the distribution of income; and the allocation of resources throughout the economy. On the other hand, continuing **deflation** is not desirable because of its potential to create economic volatility – it retards investment, amplifies the impact of debt, and may see households hoard cash rather than spend it if they believe prices will fall.

A fourth economic objective is a more **equitable distribution of income**. The aim is to increase equity or equality of opportunity in the community, and enable all members of our society to achieve an acceptable standard of living. Income distribution refers to the way in which disposable income is spread among all people. There are many factors that affect the distribution of income and wealth in an economy, but the government can improve equity through direct and indirect transfers (refer to chapter 12). Progressive income tax is the key to achieving this – as income rises, so too does the rate of tax. Tax revenue can then be used to fund programs that increase income equality.

The fifth economic objective is the **efficient use of scarce resources**. In theory, competitive markets are efficient because the price system rations the amount of goods sold by auctioning them to the highest bidder, creating an incentive for producers to use scarce resources efficiently to minimise costs. In practice, however, markets fail to produce enough public and merit goods (such as education and health) and to internalise the spillovers (externalities) that result from many economic activities. In these instances, the government can use its powers to allocate resources in a way that achieves social objectives.

Two government agencies that focus on the efficiency objective are the **Productivity Commission** and the **Australian Competition and Consumer Commission (ACCC)**. Their objectives are to reduce waste and inefficiency and promote competition and productivity growth.

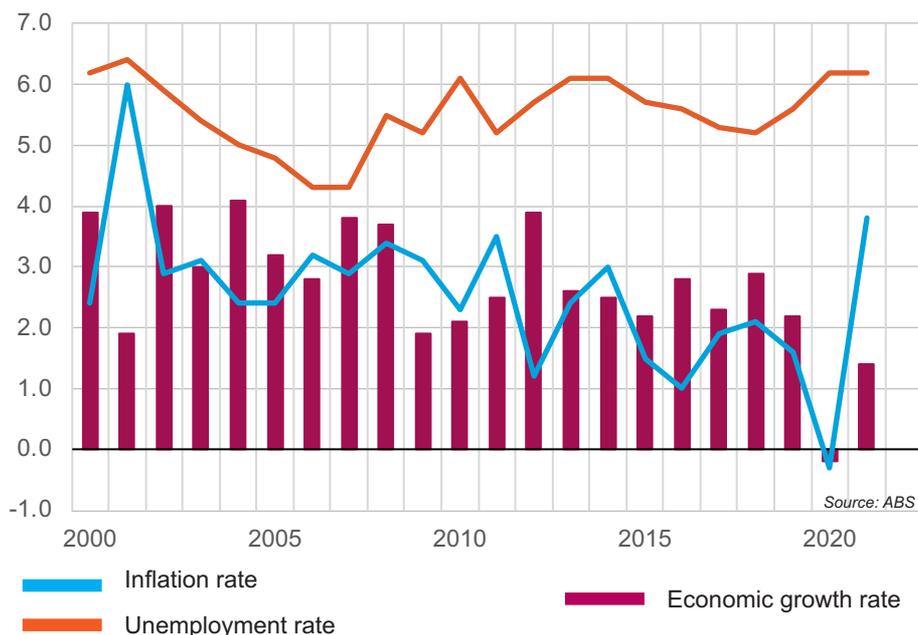
Review quiz

- 1. Distinguish between the concepts 'economic growth' and 'sustainable economic growth'.*
- 2. Suggest how low unemployment might promote a more equitable distribution of income in Australia.*
- 3. Discuss the meaning of 'efficient' resource allocation.*

13.2 Recent economic performance

In chapter 8, we described the business cycle and its expansion and contraction phases. Whilst the business cycle model depicts a smooth and regular cycle, the reality is likely to be very different. Actual business cycles are highly irregular, both in terms of the length of the phases, and their amplitude (the height of the boom or depth of the trough). Understanding where the economy is on the business cycle at any point in time is a rather inexact science (and perhaps a mixture of art and science). This is why a great deal of attention is paid to the **economic indicators** that are collected by government bodies such as the Australian Bureau of Statistics; the Reserve Bank of Australia; and by the private sector (e.g. banks; industry associations; universities and economic consultants).

Gross Domestic Product (GDP), price inflation and unemployment constitute the main broad indicators of macroeconomic performance. GDP data is released quarterly (every three months), providing the most accurate picture of trends in the macro-economy because it records the value of all output produced. Inflation numbers are also released quarterly, and unemployment data monthly. Figure 13.1 describes Australian recent macroeconomic performance against the three key objectives. Economic growth has averaged 2.7 per cent per annum over the period. Annual growth was below 2 per cent in four of those years, and exceeded 4 per cent twice. Inflation has been within the RBA target range over the period, averaging 2.5 per cent p.a.

Figure 13.1 Australia: key economic indicators 2000-2021

Unemployment data is an annual average of monthly data; inflation and growth data is the annual rate of change.

For the first time in a decade, inflation exceeded 3 per cent (the upper range of the objective) in 2021. Unemployment averaged 5.5 per cent – a little above the natural rate (4.5 per cent). As previously discussed, however, labour underutilisation provides a better picture of the ‘real’ unemployment rate. In the last decade, the underutilisation rate has often been above 12 per cent, reflecting the ‘soft’ economic conditions through most of the period.

As we saw in chapter 12, the distribution of income and wealth in Australia has become more unequal since 2000. The Gini coefficient was 0.35 in 2000 and is now 0.32 (World Bank). Performance against the efficiency objective is difficult to quantify, with productivity figures perhaps providing some estimate. In recent years, labour productivity in Australia averaged 1.2 per cent per annum (2005-2018). For the period 1990-2005, the average was 2.0 per cent. Other developed countries have seen similar slow rates of improvement (Productivity Commission, 2020).

13.3 The impact of recent events on the economy

This section presents a general description of some of the events and trends that have influenced the macroeconomic performance of the Australian economy in the last ten years. The discussion may go beyond the concepts included in the Year 11 Economics course, but the events often appear in the media, and they make good case studies of how economic literacy helps to understand ‘what’s going on’ in our economy.

The Covid-19 recession

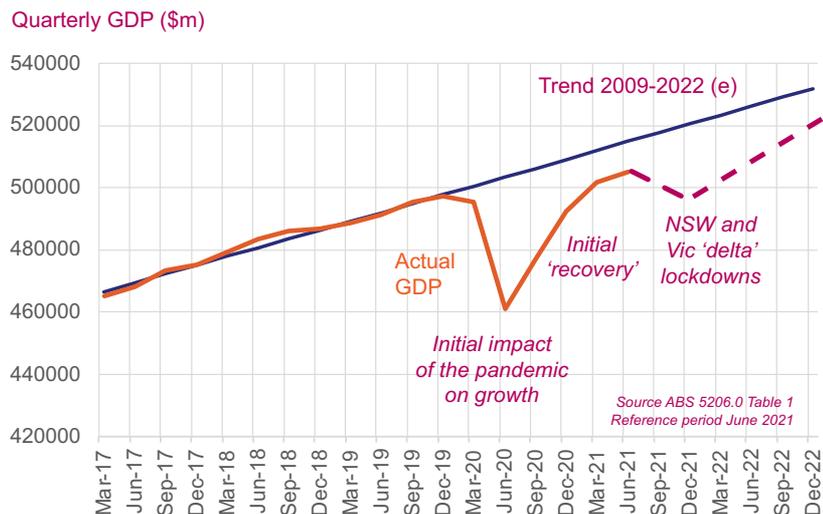
The Covid-19 pandemic is the most significant event of the last decade. As at December, 2021, there had been 240 million cases million coronavirus infections around the world, resulting in 4.8 million deaths. Arguably, the disruption caused by the pandemic has been comparable with the world wars (1914-18 and 1939-45) and the Great Depression (1929-33).

Figures 13.2 summarises the impact of the pandemic on the performance of the Australian economy. The blue line represents the GDP growth trend over the period 2009-2022, at an annual growth rate of 2.3 per cent per annum. The solid orange line shows actual quarterly GDP from March 2017 until June 2021. The plunge in GDP between December 2019 and June 2020 represented a 7 per cent drop in economic performance for that half year. A V-shaped recovery started in the second half of 2020, with growth rates above 3 per cent in both the September and December quarters. Growth in 2021 has slowed, however, due to the significant periods of lockdown imposed in NSW and Victoria to combat the 'delta' variant of the coronavirus. At the time of writing, it appears that growth in GDP will follow the dashed crimson line segment on the graph. Actual growth into early 2022 will probably rise again to be closer to the trend, but in the rest of the decade it is expected to remain beneath the blue trend line due to the long term impacts of the pandemic .

Most of us are aware of the economic impact of the pandemic during 2020 and 2021. The shutdowns and restrictions on movement necessary to contain the spread of the virus caused significant disruption to all sectors of the economy. Two-thirds of Australian businesses reported lower demand for their goods and services; and one-third experienced cash flow issues. The burden was particularly high on sectors such as hospitality, travel and tourism, as Australia's national borders were closed

Figure 13.2 Australian economic growth and the pandemic

The initial impact of the pandemic was reversed in the second half of 2020, and early 2021, but lockdowns in the eastern states after June 2021 cut growth again. The likely post 2021 recovery path is shown by the dashed crimson line, which is below the long term trend due to low population growth.



and movement between states and regions was disrupted. Agricultural producers relying on overseas workers could not get staff, and tertiary education (Australia's third largest export for most of the 2010s) lost nearly all of its new intake of students from overseas in both 2020 and 2021.

In order to stay afloat, many firms 'pivoted' their business practices – restaurants, hotels and cafes survived by offering take-away service; retailers shifted further towards on-line sales; schools delivered classes on-line; and many businesses cut office time and conducted their business through email and 'Zoom' meetings. Even in the 'depths' of the pandemic, however, some sectors did relatively well. Sales of home wares and home office equipment increased as more people worked from home. On-line sales rose to about 11 percent of total retail sales in 2020, up from 6 per cent in June 2019.

As a result of the disruption, economic growth slumped, with GDP falling two per cent in the financial year to June 2020. Seventeen of the twenty G20 countries reported negative GDP growth in the year ended March 2021 (Trading Economics, 2021). Household consumption fell and savings rose. Many people kept their jobs and income, but could not spend it because parts of the economy were closed or operating at reduced capacity. Others lost all or part of their income and had to cut spending in order to purchase essentials or meet their commitments.

Unemployment rose as trading restrictions took hold and household income and confidence fell. In Australia, the official unemployment rate rose from 5.1 per cent in December, 2019 to 7.4 per cent in June, 2020. The number of unemployed rose from 690,000 to 994,000 over this period. The official rate understated the true picture, however, because the ABS classified those who received the JobKeeper allowance as 'employed' – even if they had been stood down, or worked zero hours. The participation rate also fell, as the chances of obtaining a new job were slim. Taking these into account, the 'true' unemployment rate in June could have been around 10.5% – having been as high as 14% in April! More workers were employed on reduced hours, so the underutilisation rate by mid-2020 may have been in the region of 16 –18 percent! The downturn had a disproportionate impact on young workers and women, who are more likely to be employed on a casual or part-time basis.

Inflation, already below 2 per cent p.a. for most the period 2014-2019, fell at the end of 2020, before rising in 2021 as a result of cost pressures (see next section).

The Australian government used its spending powers to support households and businesses. The budget deficits forecast from 2020 to 2025 will result in a huge increase in government debt. Prior to the pandemic, forecast debt stood at 19.5 per cent of GDP for June 2020, declining to 1.8 per cent of GDP by the end of 2030. As a result of the pandemic, net debt is now forecast to be 34.2 per cent of GDP at 30 June 2022, increasing to a peak of 40.9 per cent of GDP at 30 June 2025. Reserve Bank monetary policy was also highly expansionary, with the cash rate cut to 0.1 percent (the lowest ever) and 'unconventional' measures introduced to ensure funds were available at low interest rates into the future.

At the time of writing, the path to full recovery from the Covid-19 recession is becoming clearer. High vaccination rates will enable businesses to open, although many will have low reserves over 18 months of uncertainty. There may be a short period of high growth as people resume ‘normal’ activities, but this may carry the risk of inflation as demand and supply rebalance.

Over the rest of the 2020s, it is likely that the actual growth path in figure 13.2 will remain below trend, because:

- the pandemic has affected study patterns and early career development for young people;
- migration has stopped. In 2020-21, net migration was negative – instead of the usual 200,000 migrants (average over the period 2000-2018), there was a net loss of 95,000 (ABS). This is significant as migration has accounted for about 60 per cent of population growth since 2005, and population growth accounts for about half of economic growth; and
- world supply chains have been severely disrupted and will take time to adjust to a ‘new normal’.

The risk of inflation

Inflation was thought to be ‘under control’ in developed economies since the early 1990s (see chapter 9). Indeed in the late 2010s there was concern about the possibility of **deflation** as there were slow rates of economic growth and historically low interest rates in many countries. During the early part of the Covid-19 pandemic, inflationary pressure remained low in most countries as lockdowns triggered a collapse in aggregate demand and a pause in global trade.

Price levels started to rise again in late 2020. According to the ABS, the CPI rose 3.8 percent in 2020-21 (add the four quarters from September 2020 - see the sidebar). Prices in the transport and furniture, household equipment and services sectors saw ‘double-digit’ increases in the June 2021 quarter. Core inflation, however, was 2.1 per cent.

So why has inflation risen as economies recovered from the pandemic? Firstly, there may have been too much money chasing too few goods because of the pent-up demand accumulated during the pandemic, the millions of dollars of government stimulus that propped up the economy, and record low interest rates that encouraged borrowing.

Quarter	CPI
Sept 2020	1.6
Dec 2020	0.9
March 2021	0.6
June 2021	0.7
Sept 2021	0.8

Source: ABS Consumer Price Index
September 2021

Secondly, Covid-19 caused considerable disruption to the complex **supply chains** that support production and distribution of goods around the world. The pandemic exposed the problems that can occur when the ‘just-in-time’ supply system built during the recent era of globalisation was disrupted. Air freight volumes fell because passenger aircraft were grounded, and most of them also carry considerable amounts of freight. The cost of transporting goods in sea containers rose by 50 percent on Australian routes as port

activity slowed because of Covid-19 protocols; containers were diverted to routes with quicker turnarounds in the northern hemisphere; and because increased orders put greater pressure on delivery systems, both on sea and land.

Oil prices initially crashed, then rapidly returned to normal. Petrol prices in Australia were below a dollar per litre in June 2020, but above \$1.50 twelve months later. From September 2021 there was a significant rise in prices and an 'energy crisis' in some northern hemisphere countries.

The question is whether these inflationary pressures are temporary, or will continue for some time. As at November, 2021, although international inflation rates were higher than they have been in some years, core rates were above 3 per cent in just 8 of the G20 countries. Opinion was divided as to whether inflation would be transitory, or whether the factors described above would take a longer time to play out.

There have been labour shortages in key sectors in many countries, which causes competition for workers and pressure on wages in order to attract labour. Secondly, commodity shortages have lasted longer than expected, with many of the world's large ports congested in late 2021. Thirdly, prices for key raw materials such as oil and copper have risen to meet demand as the economy recovers. There is also some risk that the increasing pace of decarbonisation will increase the prices of key metals such as copper, manganese, nickel and rare earths.

Climate change

As discussed in chapter 5, global warming and its impact on climate is a case study in **market failure** – although the term 'case study' seems inappropriate when the potential consequences of climate change are considered. Since the Industrial Revolution, the concentration of carbon dioxide in the atmosphere has increased from 280 ppm (parts per million) to over 410 ppm, and the concentration of methane has doubled. The extent of global warming resulting from greenhouse gas emissions is currently around 1.1°C since 1850 (and 1.5°C in Australia), according to the Intergovernmental Panel on Climate Change (IPCC, 2021). The question is whether the rate of warming can be controlled enough to stay within the 2015 'Paris target' (keeping global mean temperature below 2°C, and preferably no more than 1.5°C compared to pre-industrial times).

Climate change and global warming pose a significant economic threat for all countries. Risks include:

- increased frequency of droughts, heat waves, bushfires, cyclones and floods that will have a significant impact on agriculture and food production – perhaps reducing GDP by one per cent per year
- flood and inundation risks to properties near rivers and coasts
- loss of biodiversity and damage to ecosystems

To economists, emissions are a **negative externality** associated with industrial and household activity in an economic system that relies on carbon – key 'problem sectors' being energy generation; transport; agriculture; manufacturing and

construction. Of course, there are other issues associated with man's large 'footprint' on the environment and its ecosystems – plastics pollution and depletion of forest and fishery stocks being other examples.

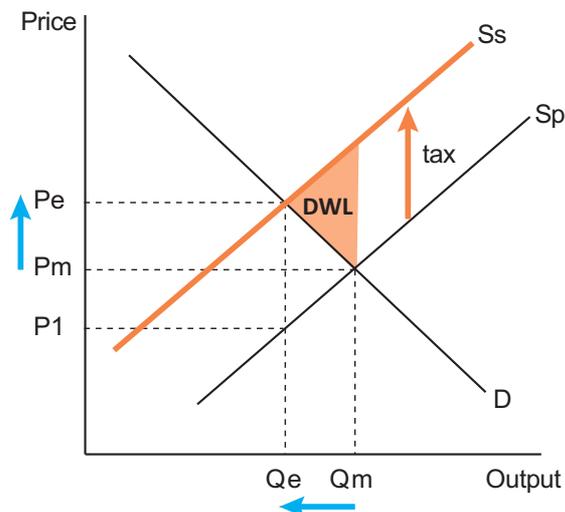
Can economies offer any solutions? Economists favour market-based policies such as a carbon tax or an emissions trading scheme (ETS). The production and consumption of goods that create carbon emissions impose external costs on society and create a deadweight loss. In figure 13.3, the social cost curve (S_s) lies above the private cost curve (S_p). A carbon tax works the same way as any other tax. The government sets a tax that companies are charged for every tonne of carbon emissions they produce. By taxing these goods, the deadweight loss is eliminated. The tax raises the price of goods with carbon emissions such as electricity or petrol from P_m to P_e and reduces the market quantity from Q_m to the socially optimal quantity of Q_e . The tax increases the cost to firms which means that the external cost has been internalised.

In the short term, consumers feel the pain of higher prices and producers receive lower sales revenue after the tax. The government collects revenue from the tax and can use part of it to support consumers or producers who have been adversely affected, such as pensioners who cannot afford higher power prices. In the medium term, the tax acts as a disincentive to use carbon-based products. Consumers might install solar panels and batteries, switch to more fuel-efficient cars, or take public transport. To cut costs, producers will change their production methods and design products that meet emissions guidelines, and therefore avoid the carbon tax.

Currently about 30 of the world's countries have implemented a carbon tax. Australia had a carbon tax between 2012 and 2014, but abandoned the policy because it was 'too costly' (politically). Emissions did fall by 1.4 per cent over that period, however, and its abolition was probably shortsighted because it removed the incentives to change that could have led to new growth opportunities and jobs in the economy. The tax would have put Australia on a low emissions pathway much more quickly.

Figure 13.3 A carbon tax

The creation of carbon emissions impose significant external costs on society - the social cost curve (S_s) lies above the private cost curve (S_p). The market overproduces at Q_m and creates a deadweight loss. A carbon tax internalises the external costs so that S_p will shift up to equal S_s . Price increases to P_e and output is reduced to the socially optimal Q_e . The deadweight loss has now been eliminated and society's welfare (total surplus) has been increased.



Interestingly, Europe is introducing a carbon tariff on imports from countries that do not have a carbon tax from 2026, in order to protect European industries from 'unfair competition' from countries where no tax is levied. This will add to the cost of imports from Australia, making them less competitive. The revenue from the tariff, however, will go to European governments, not Australia's!

An ETS (sometimes called a 'cap and trade' program) issues a set number of emissions permits. Firms buy these at a fixed price, or bid for them at auction. They can then trade them (buy more or sell those they no longer need on secondary markets), creating a carbon price which fluctuates according to demand and supply. Australian federal government policy in establishing emissions targets and setting a road map for change was criticised at the COP-26 climate conference in Glasgow in November 2021.

Around the world, many de-carbonising solutions are being gradually implemented, such as:

- expanding the use of renewable energy from wind and solar sources, and installing batteries to store power. The price of electricity generated by green technology, and of battery storage, has already fallen enough to be competitive with the coal-fired grid, so the pay-off period required to break even on switching systems has also fallen.
- switching to electric vehicles, using incentives to encourage buyers and building necessary infrastructure such as charging stations
- building a clean energy economy by investing in low-emissions energy technologies, such as hydrogen, which some believe can be the basis of new industries in Australia
- reducing the clearing of forests - instead planting trees to increase the carbon biomass
- making urban areas more sustainable (eco-cities) using smart building, increasing electric transport and planting trees
- encouraging a 'commons transition' - building cooperative and circular economies

The market, however, moves on without waiting for policy, seeking investments into 'climate smart' investments. The urgent need for action on emissions (see box) will result in significant **structural change** in the Australian economy. There will be considerable **price and substitution effects** as businesses and consumers respond to price signals and seek 'better' ways of producing and consuming.

The required changes will create 'winners and loser's. Jobs will leave high-emissions industries and migrate to 'greener' ones, but those jobs will require new skills. The good news for the economy is that structural change always creates incentives to reduce costs, increase efficiency and develop new products. Problems create economic incentives to find solutions! We can be sure there are currently many entrepreneurial companies out there seeking ways to take advantage of those opportunities.

Pathways to lower emissions

Greenhouse gases (GHGs) trap heat from the sun and keep the planet's average temperature at about 15°C. The main GHGs in the atmosphere are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), water vapour, and neon.

Increased concentrations of GHGs from human activity trap more solar radiation and cause atmospheric warming. Carbon dioxide accounts for about 75% of those emissions, and methane about 20%. Methane traps more heat than CO₂, and stays in the atmosphere for about a decade, compared with the centuries-long persistence of CO₂.

This process has been understood since the early nineteenth century. Global surface temperatures are now 1.1 °C higher than in 1850, with larger increases over land. The global mean sea level (GMSL) is 0.20m higher than it was a century ago.

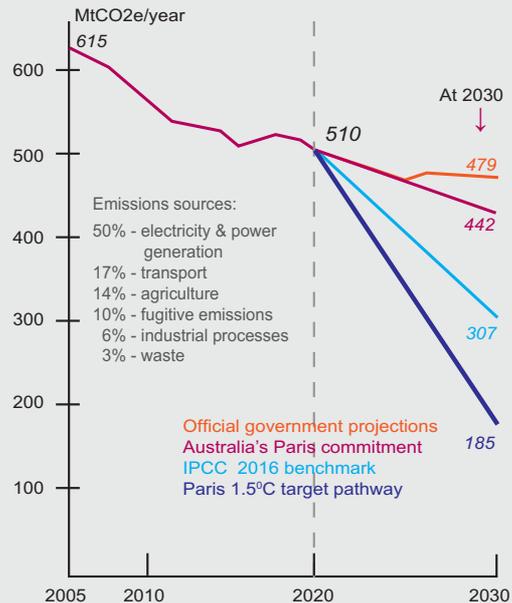
Over the period 1950 to 2020, the concentration of all GHGs in the atmosphere increased - CO₂ from 310 – 420 ppm; CH₄ from 1200 - 1750; ppm and N₂O from 280-330 ppm. These are 30-40% higher than pre-industrial levels (1850). The influence of human activities was “very likely” (IPCC, 2021) the main driver of these increases – land clearing, agriculture, mining of coal and gas, construction, industrial processes, and the use of oil in transport.

Australia decreased its GHG emissions by 20% between 2005 and 2020 - they are now 510m tonnes CO₂ equivalent per annum (21 tonnes per capita, 3 times the global average). The orange line suggests that Australian emissions will fall another 20% before 2030, but this ‘high-emissions pathway’ could result in a global average warming of around 4.5°C by 2100 (+/- 1.5°C). In its 2021 report, the Australian Conservation Foundation (ACF) suggested that a 38% reduction in GHG emissions is possible by 2030 (to 380 ppm) is possible under current state government policies. This would be close to the Intergovernmental Panel on Climate Change (IPCC) benchmark of 310 ppm (about 50% of 2005 levels) – the light blue line in the chart.

To play its part in achieving the strict Paris target (the dark blue line, limit warming to 1.5°C at 2100), Australia needs to cut its emissions from 510 ppm to about 185 ppm by 2030. The ACF estimates that reducing emissions to achieve that target would require huge changes, such as:

- coal power generation to be phased out by 2030;
- electric vehicles are phased in to be about 80% of new car sales by 2030; and
- liquefied natural gas (LNG) emissions to be cut by 85%.

Basically, CO₂ emissions are reduced by keeping carbon in the ground in its ‘sinks’ – the soil, plants and oceans. Reducing methane emissions is easier than reducing CO₂ – a 40% reduction could be achieved within a decade if cultivation processes were changed and people shifted towards plant- rich diets and alternative sources of protein (United Nations, 2020). The effect of CO₂ emissions on climate is harder to solve, as any reduction in CO₂ now will take until the end of the century to impact on global temperatures.



Sources: Intergovernmental Panel on Climate Change (IPCC), 2021 . 6th Assessment Report; Australian Conservation Foundation (2021) - Australia's 2030 emissions: states lead the way; United Nations Environment Program, 2021.

Who will pay for the solutions? Like many problems, people expect the government to develop and fund policies that will reduce man's footprint. But climate change policy is a political football, hampered by the fact that emissions and pollution problems go beyond political boundaries, and therefore become someone else's problem! For consumers, creating a smaller footprint requires significant changes to household consumption patterns and preferences, and driving change by 'voting with our wallets'. It's easy, however, to stop buying plastic straws: harder to give up driving, flying and buying gadgets. Often-used tips to achieve a greener household include:

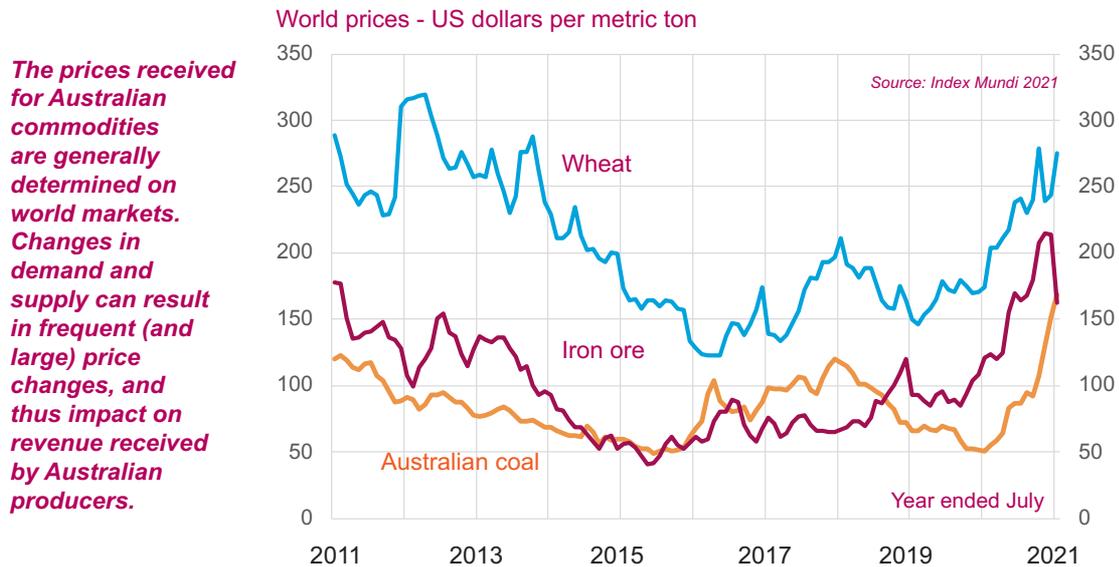
- switch to an electric vehicle (or share one)
- make your house more air-tight so cooling and heating are more efficient
- eat less meat, especially beef – halving meat consumption in a four-person family will avoid three tonnes of emissions in a year
- upgrade white goods – new products are more efficient
- install LED lights – they give the same light for 15 percent of the electricity
- join the circular economy – reduce, re-use, and recycle

Unfortunately, many households are reluctant to change their patterns of consumption by the amount required, making the costs of change larger in the future – highlighting the trade-off between current and future welfare.

Australia's economic diversity

Australia is a **medium sized open economy**, reliant on overseas trade. Trade exposure is beneficial because it means producers can access a larger potential market, and households can import products that are either not produced domestically, or at prices cheaper than those products could be made for in Australia. Australian trade features some significant characteristics not present in many other countries. Australia's main exports are agricultural and mineral commodities for which prices are determined by demand and supply in world markets. This means that Australian exporters are often **price takers**, because they have no influence on world market prices. As world prices rise and fall from time to time, so too will export revenue.

The prices Australians pay for imports, on the other hand, are usually determined by overseas **price makers** – manufacturers of finished products such as capital equipment, motor vehicles and electronic products, for which prices are fairly stable year after year. One exception is oil, for which Australia is now a net importer. Over ten years, oil's price peak was AUD 120 per barrel (September, 2013) and its low AUD 31 (June 2020). Figure 13.4 illustrates the price fluctuations for a selection of export commodities. Agricultural prices typically follow variations in seasonal conditions around the world. For example, wheat prices would be expected to rise if there was a drought in the northern hemisphere, because world supply would fall. In the last ten years, the world wheat price has been as high as USD320 per metric tonne, and as low as USD125.

Figure 13.4 Selected commodity prices: 2011-2021

The prices of mineral commodities, on the other hand, are more likely to vary in line with overseas demand for the products made with these minerals. In 2019-20, eight of the top ten exports were minerals or agricultural products (DFAT, 2021). The majority of those exports were directed to East Asia – China, Japan and South Korea. Australia has too many eggs in the one basket! Its trading position, and its prospects for future growth, would benefit by developing a more diverse economy – a broader range of tradable activities, and more trading partners.

Australia is currently around the 15th largest economy in the world, but it is a long way down the list when it comes to economic complexity and diversity. According to the Harvard University Atlas of Economic Complexity, Australia ranked 86th out of 133 included countries in 2019. The downside of low diversity is reliance on other countries from whom we import complex products – often called **elaborately transformed goods** and services such as machinery, motor vehicles and international transport. The extent of this reliance was apparent during the Covid-19 pandemic, when supply-chain problems slowed the delivery of many imports.

Low diversity carries risks for Australia's economic performance. Firstly, the demand for Australia's resources exports may decrease over time, in which case prices and export revenue would fall and the industries would contract. Secondly, the demand from some countries might fall as a result of the political and trade tensions which emerge from time to time. In 2019, for example, a tariff war between the US and China impacted on Australia (in its difficult role as a trade partner of China and a traditional ally of the US). In 2021, China announced a number of measures that seem certain to lower its economic growth targets, and thus the demand for Australian commodities.

Thirdly, limited complexity means limited opportunities for building new competitive advantages and opportunities for workers. There is a positive relationship between economic diversity, the availability of 'good' jobs, and wage and salary rates.

How can diversification be achieved? Diversifying and building resilience does not have to mean new industries, although there are opportunities to do so, like robotics, automation, additive printing and some surprising areas such as video game development. There should be many new opportunities to be captured from de-carbonising the economy. Foreign investment could add diversity as it enables access to international supply chains, technology and 'know-how'. Better trade relationships need to be developed with, for example, India, Vietnam and post-Brexit United Kingdom and Europe. Northern Australia is under-developed, yet could be a major supplier of agricultural and energy exports. In many cases, diversity could result from 'adding value' in areas of strength the country already enjoys. Most opportunities don't rely on new discoveries or inventions – rather they stem from the development of 'know-how', innovation and risk-taking.

A job provides basic needs such as sufficient pay, security and the chance of a career. A 'good' job meets higher needs such as meaningfulness, belonging, achievement and recognition.

Demographic change and aging

By the middle of this century, about a quarter of Australians will be over 65 (up from 15 per cent now). More importantly, the old age dependency ratio is rising – from 21 older people for every 100 people of working to age in 2011 to an anticipated 29 per hundred in 2030! An aging population may result in significant challenges to economic performance in the future. Firstly, patterns of consumer demand change in aging populations. Although older people tend to have more disposable income, they tend to spend less of it on retail goods and more on services, especially those related to travel (until 70 years of age) and health care.

Secondly, aging population is associated with falling labour market participation, potentially causing shortages of skilled and experienced labour in some areas of the workforce.

Thirdly, pressure on government finances increases as tax revenue falls and age-related claims on welfare such as pensions and health care rise.

The effects of these changes has been recognised for many years, with results including encouraging superannuation planning to reduce dependence on the public purse, and improving options for retirement living and aged care.

Other influences

Other factors can also influence the performance of the economy. A number of 'non-economic' (external) events such as drought, flood, war or unexpected crises may influence the pattern of economic activity and the rate of economic growth.

Review quiz

1. *Find the latest rates of economic growth, inflation and unemployment and compare them to the benchmarks for these objectives.*
2. *Why is Australia a 'price-taker' for many commodity exports?*
3. *What impact did the Covid-19 pandemic have on Australian economic growth and unemployment?*
4. *What risks do low economic and trade diversity pose for Australian economic performance?*
5. *In what ways does the aging Australian population affect economic performance?*

Index

A

ABS 160
 absolute poverty 202
 Adam Smith 33
 aggregate expenditure
 factors affecting 111
 consumption 111
 determinants 111
 government expenditure 112
 investment 114
 net exports 115
 allocating scarce resources 12
 anti-competitive behaviour 82
 apple market 39
 appreciation 115
 assumptions 7
 Australian Competition and
 Consumer Commission (ACCC)
 83
 Australian regulatory authorities
 194
 Australia's export markets 174
 Australia's tax system 196
 Australia's trade balance 176

B

balance of payments 178
 annual data 181
 credits 178
 capital and financial account
 185
 current account 182
 debits 178
 double entry transactions 180
 primary income 183
 structure 179
 banana market 39
 barriers to entry 22
 bracket creep 158
 business cycle 136
 contraction 139
 expansion 138
 model 138
 phases 137
 peak 138
 recession 139
 trough 139
 turning points 137
 business expectations 114

C

capital & financial account 185
 capital-for-labour substitution 156
 capital deepening 128
 capital gains tax 200
 capital goods 5
 and economic growth 17
 capital market 101, 104
 capital resources 5
 carbon tax 216
 cartel 83
 ceteris paribus 7, 8, 23, 28
 changes in demand 26
 changes in supply 30
 changes in demand & supply 33
 changes in equilibrium 36
 classifying goods 91
 circular flow of income 99
 assumptions 99
 disequilibrium 105
 equilibrium 103
 exports and imports 102
 factor market 99
 full model 102
 government expenditure 101
 government sector 101
 inequality of injection and
 withdrawal 105
 interdependence of sectors
 103
 international sector 102
 open economy 102
 overseas sector 102
 saving & investment 100
 savings exceeds investment
 104
 taxation leakage 101
 climate change 94, 215
 and carbon tax 216
 and market failure 95
 club goods 92
 coincident indicators 142
 collective goods 101
 collective boycotts 83
 commodity prices 220
 common property goods 91, 93,
 192
 company tax 199
 competitive market 21
 complementary goods

 and cross elasticity 54
 complements 25
 composition of trade 175
 Consumer Price Index 148
 consumer sovereignty 22
 consumer surplus 61
 and demand 60
 consumption expenditure 111
 contraction 139
 Coronavirus 3
 cost of credit 111
 cost push inflation 153
 costs and benefits 8
 Covid 19 pandemic 3
 and market failure 96
 and price elasticity 49
 and toilet paper 40
 and recession 212
 CPI 148
 cross elasticity of demand
 calculation 54
 definition 54
 negative 54
 positive 54
 current account 178
 balance 185
 definition 182
 four categories 182
 incomes 182
 services 182
 cyclical unemployment 164

D

deadweight loss 72
 deflation 148
 demand curve 24
 demand
 and consumer surplus 60
 and demographic factors 26
 and disposable income 25
 and expectations 26
 changes in 26
 curve 24
 decrease in 35
 non-price factors 25
 price of related goods 25
 schedule 23
 tastes and preferences 26
 demand and supply
 changes in 33
 case study 38

- demand and supply model 23
 - demand-deficient unemployment 164
 - demand pull inflation 153
 - demographic change 221
 - depreciation 115
 - direct investment 186
 - direct tax 197
 - direction of trade 173
 - disequilibrium 104
 - disposable income
 - and consumption 111
 - distribution of income 202
 - durable goods 110
- E**
- ecological footprint 125
 - economic 'bads' 133
 - economic contraction 139
 - economic cost 11
 - economic efficiency 67, 156
 - economic growth 16
 - and capital goods 17
 - and investment 18
 - and PPF 119
 - benefits and costs 131
 - measurement
 - optimal rate of growth 134
 - rate of growth 121
 - economic indicators 142
 - coincident 142
 - lagging 142
 - leading 142
 - economic models 6
 - economic objectives 208
 - economic growth 208
 - efficient resource use 210
 - equitable income distribution 209
 - full employment 209
 - price stability 209
 - economic problem 2, 9, 21, 118
 - economics
 - as a social science 6
 - definition 3
 - meaning 2-3
 - normative 8
 - positive 8
 - economic system
 - market economy 19
 - mixed economies 19
 - economic transactions 178
 - economic welfare 80
 - economic efficiency 67
 - and government policies 69
 - efficiency wages 163
 - elasticity 42
 - enterprise 5
 - environmental resources 88
 - equilibrium 106
 - and total surplus 67
 - defined 31
 - in circular flow 103
 - macroeconomic 104
 - equity 77
 - horizontal 78
 - vertical 77
 - exchange rate
 - and aggregate expenditure 115
 - excise duties 200
 - exclusive dealing 84
 - exclusion principle 91
 - expectations
 - and investment 113
 - effect on consumption 112
 - exports
 - factors affecting 115
 - external benefits 88
 - external costs 87
 - externalities 85
 - negative externalities 86
 - positive externalities 87
 - reasons for 88
- F**
- Factor markets 21
 - factors of production 5
 - financial account 178, 186
 - financial institutions 100
 - firms 99
 - fiscal dividend 131
 - free goods 2, 88, 133
 - free lunch 9
 - free riders 91
 - fringe benefits tax 199
 - frictional unemployment 163
- G**
- GDP 108, 110, 112, 114, 119, 133
 - and PPF 119
 - as a measure of growth 123
 - calculating increase 121
 - GDP per capita 122
 - nominal & real 120
 - growth rates 122
 - GDP gap 168
 - GDP per capita 122
 - Gini coefficient 203
 - global financial crisis (GFC) 141
 - global warming 94
 - global temperatures 95
 - goods & services tax 199
 - government 101
 - role of 190
 - government expenditure
 - current and capital 114
 - factors influencing 114
 - government intervention
 - and externalities 88
 - and income inequality 205
 - and market power 83
 - government policies
 - and economic efficiency 69
 - and externalities 88
 - and market power 83
 - Gross Domestic Product 108
 - and growth 119
 - problems with measurement 126
- H**
- Happy planet index 125
 - horizontal demand curve 46
 - households 99
 - human resources 5
 - Human development index (HDI) 125
 - hyperinflation 156
- I**
- imperfect market 22, 80
 - imports
 - factors affecting 115
 - incidence of a tax 57
 - income concepts 202
 - income effect 23
 - Income elasticity of demand
 - defined 54
 - formula 54
 - inferior good 54
 - normal good 54
 - income redistribution 205
 - increase in demand 35
 - causes of 27
 - increase in supply
 - causes of 30
 - indirect tax 197
 - inefficiency of a tax 74
 - inflation 118, 148
 - Australian data 152
 - consequences 155

- and economic efficiency 156
 - and international competitiveness 156
 - and lenders / borrowers 157
 - and savers 157
 - and uncertainty 156
 - and unemployment burden of 157
 - cost push 153
 - definition 148
 - demand pull 153
 - effects 155
 - headline 150
 - index numbers 149
 - measurement 148
 - rate of 150
 - trimmed mean 151
 - underlying 150
 - weighted median 151
 - infrastructure 101
 - injection 100
 - interest rates 113
 - and consumption 111
 - nominal vs real 113
 - opportunity cost 113
 - internalising externalities 89
 - international business cycles 140
 - investment 112
 - and economic growth 18
 - investment expenditure
 - and profitability 113
 - factors affecting 112
 - invisible hand 19, 33
 - involuntary unemployment 163
- J**
- JobKeeper 213
- L**
- labour force 160
 - labour productivity 128
 - lagging indicators 142
 - law of demand 23
 - law of increasing opportunity cost 14
 - leading indicators 142
 - leakage 100
 - limited resources 2
 - Lorenz curve 203
- M**
- macroeconomic objectives
 - compatible 118
 - conflicting 118
 - economic growth 118
 - full employment 118
 - price stability 118
 - macroeconomics 6, 114
 - relevance 98
 - macroeconomic management 195
 - marginal analysis 12
 - marginal benefits 12
 - marginal costs 12
 - market 21, 31
 - market economy 21, 22
 - market failure
 - and case studies 94-96
 - and Covid pandemic 96
 - and government policy 69
 - climate change 95
 - common property goods 93
 - defined 80
 - price ceiling 71
 - price floor 72
 - types of 80
 - market power 81
 - maximum price 71
 - merit goods 192
 - mergers 84
 - microeconomics 6, 98
 - midpoint method 45
 - mixed economies 19
 - modified market economy 190
 - monetary policy 112
 - multifactor productivity 129
- N**
- national Accounts 108
 - natural monopolies 91
 - natural rate of unemployment 166
 - natural resources 5
 - negative externalities 86, 133
 - negative externality 88
 - non-durable goods 110
 - nonrival consumption 92
 - normal good 54
 - normative economics 8
 - normative statements 9
- O**
- open economy 102
 - opportunity cost 11, 112, 169
 - and university degree 11
 - optimal rate of growth 134
- P**
- participation rate 160, 213
 - pattern of Australia's trade 172
 - personal income tax 199
 - Phillips curve 169-70
 - population growth 127
 - portfolio investment 186
 - positive cross elasticity of demand 54
 - positive economics 8, 134
 - positive externalities 87
 - positive statements 9
 - predatory pricing 84
 - predicting market changes 38
 - price ceiling 71
 - price controls 71
 - price elasticity of demand
 - and price discrimination 49
 - and total revenue 47
 - and substitutes 43
 - applications 55
 - burden of a tax 57
 - changes along demand curve 45
 - defined 42
 - elastic & inelastic 44
 - formula 42
 - elasticity coefficient 43
 - midpoint method 45
 - percentage change calculation 42
 - perfectly elastic 46
 - perfectly inelastic 46
 - point method 44
 - price elasticity of supply
 - definition 51
 - determinants 52
 - formula 51
 - price floor 72
 - price inelastic demand
 - and taxes 58
 - price mechanism 22, 33
 - price adjustment 33
 - principle of decreasing marginal benefit 12
 - private goods 88
 - private investment 110
 - privatisation 191
 - problem of choice 3
 - producer surplus 64
 - and supply 64
 - production possibility frontier (PPF) 168

and economic growth 16
 assumptions 13
 changes in 16
 product markets 21
 productivity 128
 progressive tax 197
 property rights 88
 proportional tax 198
 public goods 91, 92

R

rate of growth
 calculation 121
 rate of inflation 150
 rate of interest
 and investment 113
 real rate 113
 rational self-interest 8
 real cost
 see opportunity cost 11
 real rate of interest 113
 recession 164
 and unemployment 164
 redistribution of income 195
 regressive tax 198
 regulation of business 193
 relative scarcity 9
 resale price maintenance 84
 resources 5
 resource taxes 200
 restrictive trade practices 82
 risk 112
 role of government 190
 role of markets 21
 role of prices 22

S

saving 110, 112
 scarcity 2, 3, 9
 scarcity value 10
 scientific method 6
 services 110
 shortages 33
 social benefit 88
 social cost 87
 social infrastructure 129
 social overhead capital 5
 specialisation 4
 structural change 165
 structural unemployment 165
 subsidies 73
 and inefficiency 76
 substitutes 24, 25

and price elasticity 50
 substitution effect 23
 supply
 and prices of inputs 29
 and producer surplus 64
 and technology 29
 curve 28
 decrease in 35
 defined 27
 increase in 35
 law of supply 28
 movement 30
 non-price factors 28
 shift 30
 supply curve 28
 surpluses 33
 sustainability 133

T

taxation 205
 and inefficiency 74
 and price elasticity 56
 company 199
 direct 197
 GST 199
 income 199
 indirect 197
 marginal rates 199
 progressive 197
 proportional 198
 regressive 198
 types 198
 taxes and subsidies 73
 tax reform 201
 taxi market 70
 time to respond
 and elasticity 50
 total economic surplus 66
 and economic efficiency 67
 and equilibrium 67
 total revenue
 and elastic demand 48
 and inelastic demand 48
 trade
 benefits of 172
 pattern of 172
 reasons for 172
 trade deficit, 177
 tradeoff 15
 trade surplus 176
 tragedy of the commons 93
 transfer income 157
 transfer payments 101, 205

U

underutilisation rate 162, 213
 underemployment 162
 unemployment
 and inflation 169
 causes 163
 cyclical 164
 economic impact 168
 frictional 162
 GDP gap 168
 involuntary 163
 natural rate 166
 rate 161
 structural 165
 voluntary 163
 unlimited wants 2

V

value judgment 8
 voluntary unemployment 163

W

wealth 202
 willingness to accept 67
 willingness to pay 61